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ADDRESSES AND ORIGINAL ARTICLES

THE TRANSMISSION OF YELLOW FEVER.*

BY EDWARD HINDLE, SC.D.,
THE BEIT RESEARCH FELLOW IN TROPICAL MEDICINE.
(*From the Wellcome Bureau of Scientific Research.*)

THE mode of transmission in yellow fever is generally considered to have been settled by the work of the famous American Yellow Fever Commission in 1900. (See Senate Documents, 1911.) Practical methods of combating the disease, based on these results, have succeeded to a degree almost unparalleled in the case of any other disease, but although the main conclusions of the Commission, to the effect that yellow fever is transmitted only by the bites of *Stegomyia fasciata* (*Aëdes ægypti*), would seem to have been justified in the light of subsequent practical experience, recent investigations have shown that this generalisation requires some modification.

It should be noted that before 1927 all work on yellow fever necessitated the use of human volunteers, and consequently the number of actual transmission experiments is comparatively few. The discovery by Stokes, Bauer and Hudson (1928) that *Macacus rhesus* is susceptible to the infection, has opened the possibility of studying the transmission problem in much greater detail, and as some of these results are at variance with generally accepted views on the subject it seems desirable to re-examine the evidence on which these are based, and also to incorporate recent work, including the results of my own experiments on the subject.

These experiments have been carried out during the past two and a half years at the Wellcome Bureau of Scientific Research, and I should like to take the opportunity of expressing my great indebtedness to Dr. Wenyon and the staff of the Wellcome Foundation for their kind assistance in the course of these investigations. In particular, I should like to mention the very great help I have received from Mr. B. Tazelaar, to whom I am indebted for continual assistance during the whole of this period.

The Virus.

Four strains of yellow fever virus have been studied, three African and one Brazilian, and no marked difference could be found between any of these strains. Vaccination or other methods of immunisation against one strain protected indiscriminately against the other strains, and my results fully support the now generally accepted view as to the identity of the African and American strains of yellow fever. With regard to the behaviour of these strains in monkeys, one of the African strains from Senegal, the first to be established in any laboratories outside endemic regions (Sellards and Hindle, 1928), has shown alterations in its virulence which will be referred to elsewhere. Apart from the results obtained with this modified virus, all the strains have shown a very high degree of virulence in monkeys, the mortality exceeding 95 per cent. in a long series of experiments. In addition to the French strain, experiments have been made with the Asibi strain, from Nigeria, obtained through the kindness of Dr. W. A. Sawyer; a Berlin strain originally from Africa, and a Brazilian strain from Rio de Janeiro, the two last kindly supplied by Prof. M. H. Kuczynski.

*Communicated this week to the Permanent Committee of the Office International d'Hygiène Publique, now in session.

COURSE OF INFECTION IN MONKEYS.

The course of yellow fever in *M. rhesus*, whether the disease has been induced by the inoculation of infected material or by the bites of infected mosquitoes, is very constant in its general features, though individual differences may be observed. After an incubation period of two to five days without any prodromal symptoms the temperature suddenly rises 2-3° F. above the normal of the individual, and after 24 to 48 hours the temperature suddenly falls to subnormal, and the monkey generally succumbs within a few hours of this terminal crisis. Occasionally there is a second rise of temperature producing the saddle-back type of temperature chart commonly seen in human cases. It will be noticed that the course of the disease is much more rapid in monkeys than in man, and this difference should be remembered in comparing the two. Human cases of the disease very rarely succumb before the fourth or fifth day of fever, the majority of deaths occurring about the sixth or seventh day, whereas monkeys usually die within two or three days of onset of fever.

Possibly as a result of the longer interval there is a marked difference in the infectivity of the tissues of monkeys and human beings dead of yellow fever. In monkeys the virus often persists in the body until the death of the animal but in man the virus generally disappears before death, or its presence is concealed by the development of immune bodies. A practical result of this difference is that human post-mortem examinations are attended with very little danger of infection, whilst monkeys usually contain the active virus at death, and judging by the number of laboratory infections, in which other sources of infection were excluded, it would seem that especial precautions are necessary in examining these animals.

Kuczynski and Hohenadel (1929) were the first to show that yellow fever virus is present in the blood of monkeys within a few minutes of their inoculation. According to these authors, the virus lives in the blood, at least in the earlier stages of the disease, and consequently may be recovered from the circulation throughout the whole of the incubation period. In one instance they recovered the virus from the blood of a monkey within eight minutes after the inoculation, and in other cases from 4 to 18 hours later. Hudson and Philip (1929) independently confirmed and extended these observations, and showed that the blood of yellow fever monkeys may become infective to mosquitoes within 12 hours after inoculation, and remains infective throughout the incubation period, and at least during the febrile period and for one day afterwards. These authors' experiments, conducted in detail on five rhesus monkeys, are of very great interest, for not only were many batches of mosquitoes fed on the animals on each successive day after being inoculated, but also at the same time samples of blood were taken and inoculated into normal monkeys. Their results clearly indicate that in monkeys the blood usually ceases to be infective to mosquitoes within 24 hours of the first drop in temperature. It should be noted that two of these monkeys showed the saddle-back type of temperature chart often seen in human cases.

The results of these and other experiments, which will be referred to below, indicate that in monkeys the blood commonly ceases to be infective to mosquitoes one to three days after the onset of fever, although the virus may still be present in the blood,

its presence being masked by the development of immune bodies.

Course of Infection in Man.

The members of the American Commission in Cuba (1900) were the first to investigate the infectivity of the blood to mosquitoes, and showed that the blood was infective during the first three days of fever. Marchoux and Simond (1906) also found that the disease could be transmitted by the bites of mosquitoes fed on patients during the first three days of the disease, but failed to produce infection with the bites of mosquitoes fed during the incubation period of the disease. As a result of these few observations it is dogmatically asserted in most of the current text-books that the blood of yellow fever patients is infective *only* during the first three days of fever, and most quarantine regulations have been based on this assumption, but it must be admitted both from experiments on monkeys and on theoretical grounds that it is highly probable that the blood of human yellow fever patients is infective to mosquitoes also during the incubation period, though doubtless the concentration of virus increases with progression of the disease.

Recent work in the main supports the generally accepted view that the blood ceases to be infective after three to four days, and in many instances earlier. Thus Aragão (1928) tested the blood of 21 yellow fever patients during the 1928 epidemic in Rio de Janeiro. Five of these patients had been ill for more than 72 hours, and in every case their blood failed to infect monkeys. The remaining 16 gave varying results, some producing infection and others not. Parts of the liver, spleen, or kidney of seven patients who died on the fourth and fifth days of illness also failed to produce infection when inoculated into monkeys. Sellards and Mathis (1928) obtained similar results in Dakar during the 1927 epidemic, for blood collected from yellow fever patients on third to seventh days and all post-mortem material failed to produce infection in monkeys.

Although these results indicate that as a general rule the blood ceases to be infective soon after the onset of fever, it is clear that occasionally it produces infection later. Thus the blood of a patient in West Africa was infective up to 84 hours after the beginning of fever, though after the first day mosquitoes fed on this case failed to become infected. (See Sellards and Mathis, 1928.) Kuczynski and Hohenadel (1930) obtained infection with the washed leucocytes from a mild case of yellow fever on the eighth day of the disease, four days after the fever had disappeared, but in this case the whole blood failed to produce infection. The following two records of recent laboratory infections with a Brazilian strain of yellow fever, that had been maintained in monkeys and mosquitoes for approximately one year, also show that the virus may persist in the blood for at least four days after the beginning of fever.

CASE 1.—Laboratory attendant, presumably infected by skin contamination with the blood of a rhesus monkey infected with a Brazilian strain of yellow fever. The patient had a severe attack of the disease and showed all the characteristic symptoms including intense jaundice and albuminuria, black vomit, and hæmorrhages in various parts of the body. Four c.cm. of citrated blood collected on the fourth day of fever were inoculated intraperitoneally into a rhesus monkey, which showed a rise in temperature five days later, and died on the sixth day with typical signs of yellow fever, confirmed both by post-mortem and histological examination.

CASE 2.†—A hospital attendant whose only possible exposure to infection was whilst doing laboratory blood tests on a yellow fever patient. Ten days after having examined this infected blood the patient became ill, and on the third day of fever was given an injection of 30 c.cm. of immune serum. In the afternoon of the fourth day of fever 1 c.cm. of his blood was drawn off and inoculated intraperitoneally into a rhesus monkey, which showed a rise in temperature four days later and collapsed the following day. Post-mortem examination showed the typical appearances of yellow fever, confirmed by the histological changes in the liver.

† A full account of this and other cases will be published by Dr. G. C. Low and Dr. N. Hamilton Fairley, to whom I am much indebted for some of these details.

The second case presents many points of interest, such as the method of infection, showing that the blood of human yellow fever patients is highly infectious; the rather long incubation period of 10 days; and, finally, the infectivity of the blood on the fourth day of fever, even after a large injection of immune serum. This patient recovered after a mild attack of the disease.

Occasionally the virus has been recovered from human tissues post mortem. Davis and Burke (1929) infected a monkey by the inoculation of kidney tissue taken at the autopsy of a yellow fever patient who died three and a half days after the beginning of fever. The strain obtained, however, was non-virulent and produced very mild infections in monkeys.

Summarising the results of recent observations on the infectivity of the blood during the course of yellow fever, it is evident that the blood must be infective to mosquitoes during the incubation period of the disease. After febrile symptoms have appeared the blood usually ceases to be infective within three days, although exceptionally the infection may persist until the fourth day. As a result of this early disappearance of infectivity there is little danger of acquiring the infection when performing autopsies on human yellow fever cases, though in monkeys, which generally succumb within two or three days of the onset of fever, the blood and organs are usually infective at death.

Methods of Infection other than by Mosquitoes.

Since 1928 yellow fever has been studied in various European and American laboratories in non-endemic regions where the possibility of natural transmission has been eliminated, yet cases of human infection have occurred in all except one of these laboratories. It may be argued that the virus in monkeys is different in its behaviour from that in man, but the history of the disease in the two hosts does not support this view. Moreover, the records of laboratory infections acquired from virus that had been passaged through monkeys for periods varying from 1 to 2½ years show that such cases have presented every type of the disease, from very mild cases impossible to diagnose clinically and only recognised by the inoculation of their blood into monkeys, up to very severe cases with the typical symptoms of albuminuria, jaundice, hæmorrhages, black vomit, and the combination of a falling pulse-rate with a rising temperature (Faget's sign).

In most cases it has been impossible to decide exactly how the infection was acquired, but there seems little doubt that contamination with infected blood has been the usual method, and this is the only factor common to all the cases. The record of some recent cases of the disease shows that not only is the blood of monkeys capable of producing infection in this way, but also that of human patients. One of these (Case 2) has already been referred to. Another patient merely did a blood count on Case 2, and in turn became infected after an incubation period of ten days. Both these patients could have acquired the infection in no other way than by contamination of the skin whilst handling infected blood. They had

never had any possibility of coming in contact with infected monkeys or mosquitoes.

Although there are no experiments on the passage of the virus through the human skin, Bauer and Hudson (1928, *b*) have shown that in the case of monkeys infection may be produced by merely rubbing infected blood on the intact and unshaven skin. According to these authors the danger of infection through the skin seems to depend largely on the amount of virus present in the infectious material. Moreover, Aragão (1929, *a*) produced yellow fever in monkeys by depositing on the intact skin the fæces of infected mosquitoes. The skin of the monkey was carefully examined with a binocular microscope before applying the virus in order to be certain that no injuries were present.

Consequently, it is necessary to reconsider the general opinion regarding the impossibility of acquiring the infection in the absence of the mosquito. Until recently all work on yellow fever has been conducted in endemic areas, and any infections have been attributed to the bites of mosquitoes or, in the case of laboratory infections, to the abnormal infectivity of monkey tissues. The cases mentioned above clearly indicate that the blood of yellow fever patients may be directly infectious to other individuals, and in view of the common occurrence of hæmorrhages during the course of the disease it seems possible that yellow fever may be spread by these means. The danger is probably not very considerable, as the blood often ceases to be infective before such clinical symptoms as hæmorrhages have appeared, but there would be a possibility of hospital staff and attendants acquiring the disease in the handling of such patients in the early stages of the disease, and especially during any blood examinations.

Transmission by Mosquitoes.

It is well known that the natural method of transmission is by the bites of infected mosquitoes, and until recently *Aëdes ægypti* (=*Stegomyia fasciata*) was supposed to be the only carrier. Doubtless this is the main carrier, but recent work with monkeys seems to indicate that other species may transmit the infection, at any rate under experimental conditions. The following is a list of the species that have been incriminated, together with the evidence on which it is based :—

Species.	Evidence.	Locality.	Authority.
Aëdes ægypti	T. M.	W. Indies, S. America, W. Africa.	Various Yellow Fever Commissions from 1900 onwards.
,, *luteocephalus* ..	I.T.My.	W. Africa.	Bauer (1928).
Aëdes (Aëdimorphus) stokesi (=*apicoannulatus*)	,,	,,	,,
Aëdes chrysogaster ..	,,	,,	,,
,, *vittatus*	,,	,,	Philip (1929).
,, *africanus*	,,	,,	,,
,, *simpsoni*	,,	,,	,,
Aëdes (Ochlerotatus) scapularis	,,	Brazil.	Davis and Shannon (1929).
Aëdes albopictus ..	,,	In lab., Amsterdam.	Dinger and colleagues (1929).
,, *scutellaris* ..	,,	,,	See de Vogel (1930).
Eretmopodites chrysogaster	,,	W. Africa.	Bauer (1928).
Tæniorhynchus (Mansonioides) africanus ..	,,	,,	Philip (1930).
Cimex lectularius ..	F.I.	Brazil.	Monteiro (1929).

T.M. = Transmission from man to man, man to monkey, and monkey to monkey.
I.T.My. = Indirect transmission from monkey to monkey.
F.I. = Fæces infective.

In addition to these experiments in which the mosquitoes transmitted the infection by their bite, the virus has been found to survive for varying periods in the gut of other species. Thus the gut of *Aëdes (Ochlerotatus) serratus* and *Aëdes (Tæniorhynchus) tæniorhynchus* that had been fed on a yellow fever monkey one month previously produced infection when inoculated into normal monkeys (Davis and Shannon, 1929). Also the virus was found to survive in *Anopheles gambiæ* for a maximum period of four days before dying out (Philip, 1930).

It is difficult to decide whether these various species transmit yellow fever in nature. Those in which the bite of the mosquito is not infective may be excluded from consideration, for they could only produce infection under very exceptional conditions. With regard to *Aëdes scapularis*, Marchoux and Simond (1906) carried out one transmission experiment on a human volunteer, but without success. In an infection like yellow fever, however, in which the blood sometimes loses its infectivity at a very early stage of the disease, any positive result is of much greater significance than a negative one. Judging from the analogy of dengue fever, which seems to be closely related to yellow fever, there seems no doubt that the disease is spread by other species of *Aëdes* in addition to *A. ægypti*, and experimentally *A. albopictus* has been shown to be an effective carrier of dengue (Simmons, St. John, and Reynolds, 1930). Consequently, it is reasonable to suppose that in the case of yellow fever other species of aëdes should be regarded with suspicion, and the experiments recorded above indicate that this supposition is well founded.

The success of antimosquito campaigns directed primarily against *A. ægypti* has led to the general belief that this is the only mosquito concerned in its transmission, but it should be remembered that in such campaigns all mosquitoes breeding in the neighbourhood of human habitations are destroyed indiscriminately. As a general rule *A. ægypti* largely outnumbers other species in yellow fever districts, and therefore with justice may be referred to as the yellow fever mosquito ; but especially in the endemic regions of West Africa it seems highly probable that allied species may play a not inconsiderable part in the spread and maintenance of the disease.

INCUBATION PERIOD IN THE MOSQUITO.

The American Commission to Cuba in 1900, in establishing the mosquito transmission of yellow fever, also found that after feeding on an infected patient, a period of about 12 days was required before the mosquito was capable of inducing the infection in normal individuals by its bite. This so-called extrinsic incubation period of 12 days has been generally accepted as the minimum incubation period, but recent experiments have shown that it is sometimes shorter. Bauer and Hudson (1928, *a*), in one instance, found that mosquitoes kept at a temperature varying between 74° and 90° F. became infective on the ninth day after having been fed on an infected monkey.

I have used two strains of *A. ægypti*, one African and the other Indian, and at a constant temperature of 28° C. (82° F.) have also obtained infection with the bites of mosquitoes after an incubation period of nine days, as, for example, in the following experiment.

Expt. 120 (Nov. 9th, 1928).—A large rhesus monkey (120) was bitten by approximately 32 West African mosquitoes that had fed nine days previously on an infected monkey on the first day of fever. The insects were kept at 28° C. After three days' incubation period monkey 120 showed a rise in temperature and died of yellow fever two days later.

On the other hand, the incubation period may be very much prolonged under certain ill-defined

conditions, for Dinger, Schüffner, Snijders, and Swellengrebel (1930) working with *A. ægypti* from Togoland and a French strain of yellow fever, in the case of one batch of mosquitoes failed to produce infection after an incubation of 22 days, although 15 days later this same batch had become infective.

Mosquitoes that have ingested infective blood do not invariably become capable of producing the infection by their bite, even when the virus can be shown to be present in their bodies.

Expt. I.M.F.—On Oct. 19th, 1928, five Indian *A. ægypti* were fed on infected monkey 112, and on the 20th and 22nd re-fed on infected monkey 116. The mosquitoes were kept at 28° C. On Nov. 1st all fed on a normal monkey 108, which died of typical yellow fever after five days. On the 6th, four of these mosquitoes remained alive and were fed on normal monkey 118 which remained uninfected. Fourteen days later this monkey 118 was bitten by a single infected mosquito of another batch and died of yellow fever five days later. On the 27th, two fed on normal monkey 124 which remained uninfected. This animal was tested for immunity 41 days later by the inoculation of 0·0001 g. infected liver and died of yellow fever six days later. On Dec. 7th two mosquitoes remaining alive were killed and their bodies inoculated subcutaneously into monkey 137, which died of typical yellow fever seven days later.

This experiment shows that in some mosquitoes the bite may not produce infection even though the virus survives in the body, and it is conceivable that such individuals might become infective after an abnormally long incubation period. Also, unless it is assumed that the mosquito which died between Nov. 1st and 6th was the only one responsible for the infection of monkey 108, there is an indication that some mosquitoes may lose their infectivity by feeding.

INFLUENCE OF TEMPERATURE ON INFECTIVITY OF MOSQUITO.

It has been generally assumed on the basis of an experiment recorded by Marchoux and Simond (1906) that mosquitoes are unable to transmit the infection or become infected at temperatures below 20° C., and at 22° C. the incubation period is prolonged up to three weeks. The results of the following experiments with mosquitoes kept at room temperatures varying from 50° to 65° F. (10°–18° C.) indicate that infection may occur at lower temperatures.

Batch 6.—On March 15th, 1929, a number of West African mosquitoes fed well on infected monkey 176 on the first day of fever and were kept at room temperature (10° to 15° C.). On April 24th, five of these mosquitoes fed on a normal monkey 201. This monkey's temperature showed no significant rise, but when tested by the inoculation of virus on May 19th and June 13th respectively it showed no reaction, so was either a naturally resistant individual or had suffered from a non-apparent attack which conferred immunity.

Batch 17.—On June 15th, 1929, 10 West African mosquitoes fed well on infected monkey 212 on the second day of fever, and were kept at room temperature, approximately 15° to 18° C. On July 5th four mosquitoes bit normal monkey 218 which showed a rise in temperature of 3° on the fifth and sixth days, which presumably indicated a mild attack of yellow fever, as two subsequent inoculations of large doses of virus produced no reaction. On Oct. 11th, 118 days after the original infected meal, four of these mosquitoes bit monkey 247, which showed a rise in temperature four days later and died of typical yellow fever on the seventh day, the diagnosis being confirmed by histological examination.

Batch 43a.—On March 14th, 1930, five mosquitoes fed well on monkey 313 infected with a Brazilian strain of yellow fever on the first day of fever. The insects were kept at room temperature which averaged 10° to 15° C. On the 28th, three mosquitoes, all remaining alive, fed on a normal monkey 334 without any result, and this animal died of typical yellow fever when inoculated with infected blood six weeks later. On April 4th, two mosquitoes fed on a normal monkey 343 which was either immunised or naturally resistant, as no obvious reaction followed the bites of the mosquitoes and three subsequent inoculations of virus had no effect. On the 8th, the mosquitoes were placed in the incubator at 28°C. and subsequently kept at this temperature. On the 15th, after being kept at 28° C. for seven days, the mosquitoes fed on monkey 344, which died six days later but without any definite signs of yellow fever. On May 9th one mosquito fed on monkey 351, which died of yellow fever four days later.

The results of these experiments indicate that the virus may persist in mosquitoes, kept at low temperatures immediately after feeding, without their bite becoming infective. Subsequent exposure to a temperature of 28° C. causes the bite of such insects to become infective. By these means the incubation period of the disease in the mosquito might be prolonged indefinitely. In some instances, however, the virus dies out in the body of the mosquito, as indicated in the following experiment.

Batch 40.—On Jan. 14th, 1930, six *A. ægypti* fed well on infected monkey 302 on the first day of fever and were kept at room temperature which never exceeded 15° C. and averaged about 12° C. On Feb. 20th four mosquitoes fed well on normal monkey 310 which remained uninfected and when subsequently inoculated with infected blood died of yellow fever seven days later. On March 6th and 11th the remaining mosquitoes were ground up in saline and inoculated intraperitoneally into normal monkey 311 which remained uninfected. Six weeks later this monkey was inoculated with infected blood and died of yellow fever after four days.

The following experiment is of importance from a practical point of view, because it shows that once a mosquito has become infective by its bite, this infectivity is retained even after subsequent exposure to low temperature.

Batch 33.—On Nov. 15th, 1929, ten *A. ægypti* fed well on infected monkey 271 on the first day of fever. After being kept at 28° C. for 12 days the mosquitoes were kept subsequently at room temperature which varied between 10° and 15° C. On Jan. 3rd, 1930, two fed well on normal monkey 298, which died of yellow fever seven days later.

It should be noted that in all the experiments recorded above the mosquitoes were fed at 28° C., as at low temperatures it is difficult to get them to feed. The results with Batch 17 indicate that mosquitoes may become infective at temperatures below 20° C., and the restriction of endemic yellow fever to tropical regions is probably due to the developmental requirements of the mosquito rather than those of the virus which it carries. The survival of the virus in mosquitoes kept at low temperatures agrees with the results obtained by Blanc and Caminopetros (1929) in the case of dengue fever.

HEREDITARY INFECTION IN THE MOSQUITO.

The results of recent experiments seem to leave no doubt that hereditary infection in the mosquito rarely, if ever, occurs. Marchoux and Simond (1905) record having produced infection in a human subject by the bite of a single mosquito that hatched from eggs laid by an infected parent. This mosquito was 22 days old when it produced infection and eight days previously had been fed on the same patient without producing any infection. It is difficult to explain the positive result of these distinguished investigators in the light of subsequent observations. Rosenau and Goldberger (1906) in 38 experiments failed to obtain such a result, and all recent attempts using infected monkeys have also given negative results.

In view of the extraordinary penetrating power shown by the virus, as evidenced by percutaneous infection, &c., it is obviously capable of reaching all parts of the body of an infected mosquito, and experiments suggest that the ovaries of these insects contain the virus (Davis and Shannon, 1930), although in these experiments the possibility of contamination by the infected cœlomic fluid bathing the ovaries does not seem to have been excluded. If the ovaries are infected it is difficult to understand why the

infection should die out as soon as the eggs are laid. Philip (1929) inoculated 200 eggs laid by an infective batch of mosquitoes at varying intervals after the first, second, and fourth blood meals, into six normal rhesus monkeys without producing any reaction. Also, negative results were obtained in five biting and two inoculation experiments with the adults hatched from other eggs laid by infected mosquitoes.

Stokes, Bauer, and Hudson (1928) had previously obtained negative results when they allowed 79 mosquitoes, reared from eggs laid by infected females, to bite a normal rhesus monkey, and Dinger, Schüffner, Snijders, and Swellengrebel (1929) record similar negative experiments. I have also obtained negative results as indicated in the two following experiments.

Batch R (African mosquitoes).—On Feb. 19th, 1929, monkey 164 was inoculated subcutaneously with the ground-up larvæ and pupæ kept at 28°C., which had developed from eggs laid by four *A. ægypti* fed on an infected monkey, Jan. 25th, and on Feb. 7th and 14th respectively. There was no reaction for 12 days and then the monkey was inoculated with infected blood and died of yellow fever five days later. The parent mosquitoes were fed on a normal monkey which died of yellow fever after five days.

Batch U (Indian mosquitoes).—On Feb. 20th, monkey 165 was inoculated with a suspension of the ground-up pupæ and adults that had developed from eggs laid by five mosquitoes fed three times previously on infected monkeys. There was no reaction and the monkey was tested subsequently for susceptibility and died of yellow fever five days after being inoculated with infected liver.

The results of all recent attempts to obtain evidence of the passage of yellow fever virus from one generation to the next in *A. ægypti* have thus been uniformly unsuccessful, and it is evident that if such transmission ever occurs, which seems doubtful, it must be so rare as to be of little or no importance in the maintenance of the disease in nature.

PASSAGE OF VIRUS FROM ONE MOSQUITO TO ANOTHER.

Marchoux and Simond (1906) were the first to show that mosquitoes might be infected without the intermediary of a vertebrate host. Freshly hatched mosquitoes were fed on an emulsion of infected mosquitoes ground up in syrup; 15 days later these insects were found to be infected, although they had never fed on a yellow fever patient. It is almost needless to add that such a method of infection could not take place in nature, but recently Aragão (1929, *b*) has suggested another manner in which the infection might be carried directly from one mosquito to another in the absence of any vertebrate host. Infected females, *A. ægypti*, were kept in contact with normal males, and the latter were found to become infected, as tested by grinding them up and inoculating the suspension into monkeys. Conversely, male mosquitoes that had been fed on a suspension of yellow fever virus were kept in the same cage as normal females, and the latter were found to become infected, as tested also by inoculating a suspension of their bodies into monkeys. The persistence of yellow fever in regions where long periods elapse without any recognised cases of the disease might be explained if it were possible for the infection to be spread in this way.

The following experiments suggest that these positive results are merely due to surface contamination of the mosquitoes by their infected fæces.

Batch 35.—On Dec. 13th, 1929, six female mosquitoes fed well on infected monkey 278 and kept at 28° C. Eleven days later four males that had been kept in the same pot were ground up and inoculated into normal monkey 291 which died of yellow fever five days later. A second monkey, 313, was inoculated with two males that had been kept with infected females for 41 days but failed to give any reaction, and when tested for susceptibility 19 days later, died of yellow fever four days after being inoculated with infected blood.

Batch 43b.—Five male mosquitoes that had been kept 19 days with infected females at 28° C. were washed in normal saline and the wash water inoculated into monkey 340, which showed a slight febrile reaction from the fourth to the seventh days after inoculation, which indicated a mild attack of yellow fever as the animal was found to be immune when subsequently tested for susceptibility. The five male mosquitoes, after having been repeatedly washed, were ground up and inoculated into a monkey 341 which showed no reaction, and when tested for susceptibility by the inoculation of infected liver after an interval of 44 days died of yellow fever six days later.

The results of this experiment indicate that there is merely a surface contamination of the males, presumably brought about by the infected fæces of the female mosquitoes. It is conceivable, but highly improbable, that such surface contamination might be passed on by the male to another female, but even in this unlikely eventuality, the bite of the latter would not become infective. Since the male never feeds on blood, it is impossible for it to ingest the virus except under experimental conditions, and therefore its fæces could never be infected in nature. The available evidence, therefore, affords no support to the hypothesis that the infection may be maintained in mosquitoes in the absence of cases of yellow fever.

DISAPPEARANCE OF INFECTION IN MOSQUITOES.

The percentage of *A. ægypti* becoming infected after having ingested yellow fever virus cannot be determined with any exactness except by the use of large numbers of animals. Also it varies with the stage of the infection in the blood, and according to external conditions such as temperature. The following experiment shows that by no means every mosquito becomes infective by feeding on infected blood.

Batch 33.—On Nov. 15th, 1929, 20 West African *A. ægypti* fed well on monkey 271, infected with a Brazilian strain of yellow fever, on the first day of fever. After feeding the mosquitoes were kept at 28°C. in a saturated atmosphere and fed on normal monkeys as follows:—

Monkey 284, on Nov. 26th, was bitten by single mosquito of batch 33; no reaction was observed during 10 following days, when another two females of the same batch were fed on it without producing any reaction. Twenty-eight days after the second feeding the monkey was inoculated with infected blood and died of yellow fever four and a half days later.

Monkey 285, on the same day, was bitten by a single mosquito of batch 33; no reaction during 14 days, when it was bitten by another single female of the same batch and died of yellow fever five days later. The mosquito used in this experiment was kept at 28° C. until Jan. 10th, 1930, when it was emulsified and inoculated into monkey 303, which failed to show any reaction.

Monkey 289, on Dec. 3rd, 1929, was bitten by a single mosquito of batch 33; no reaction during 13 days, when it was inoculated with infected liver and died of yellow fever five and a half days later.

Monkey 290, on Dec. 3rd, 1929, was bitten by a single mosquito of batch 33; became infected and died of yellow fever five days later.

Monkey 293, on Dec. 17th, was bitten by a single mosquito of batch 33, which had been fed on immune monkey 267 on the 10th. Monkey 293 became infected and died of yellow fever six days later.

Monkey 296, on Dec. 31st, was bitten by a single mosquito of same batch, which had been twice re-fed on a hyper-immunised monkey. The animal became infected and died of yellow fever after six days.

Monkey 298, on Jan. 3rd, 1930, was bitten by remaining two mosquitoes of same batch that had been kept at room temperature (10° to 15° C.) for the previous 40 days. The monkey became infected with yellow fever and was killed in extremis on the seventh day.

In this experiment out of 11 mosquitoes, five failed to become infective, whilst five produced infection by their bites. In the last positive experiment two individuals were used, so it is impossible to say whether both of them were infected or not. The incubation period of 11 days in the case of monkeys 284 and 285 may have been a little short, but one of

these mosquitoes was subsequently tested and shown to contain no virus. It will be noted that approximately half the mosquitoes became infected, and this result is supported by the general results of other feeding experiments. Usually three or more mosquitoes that had fed previously on an infected monkey were used for producing infection in a normal animal, and under these conditions only once have they given negative results. In three instances (118, 119, and 138), in addition to those recorded above, infections were produced by the bites of single mosquitoes, and in two instances single insects failed to infect; therefore, under the conditions of these experiments it seems probable that approximately half the mosquitoes become infective after a single meal of infected blood.

The infection certainly dies out in some mosquitoes, as shown in the following experiment.

Batch 26.—On Sept. 11th, 1929, seven *A. ægypti* were fed on a mixture of honey and the infected blood of monkey 228. A normal monkey, 229, was inoculated with 0·002 c.cm. of this mixture and died of yellow fever seven days later. On the 24th the mosquitoes were fed on a normal monkey, 243, which died of yellow fever also after seven days. On Oct. 29th a second monkey was bitten by the four mosquitoes remaining alive, but showed no reaction for 15 days, when it was inoculated with infected blood and died of yellow fever seven days later.

INFLUENCE OF IMMUNE SERUM ON VIRUS IN MOSQUITO.

Whilst studying the action of immune serum on the virus it seemed of interest to determine whether such serum had any action on the virus in infected mosquitoes. A preliminary experiment suggested that this might be the case for a batch of presumably infected mosquitoes (No. 22) that had been fed on an immune monkey, failed to produce infection when subsequently allowed to bite a normal monkey. It is impossible, however, to draw any definite conclusions from an experiment of this nature unless single mosquitoes are used, and consequently the test was repeated with isolated insects that had been shown to be infective.

Mosquito 33 D.—On Nov. 18th, 1929, fed on monkey 271, infected with Brazilian strain; on Dec. 3rd fed on normal monkey 290, which died of yellow fever after five days; on Dec. 10th fed well on immune monkey 257; and on Dec. 17th was allowed to bite normal monkey 293, which died of yellow fever six days later.

Mosquito 33 F.—On Nov. 15th, 1929, fed on infected monkey 271; on Dec. 10th fed on normal monkey 285, which died of yellow fever after five days; on the 13th fed on immune monkey 257; on the 24th fed on immune monkey 170; and on the 31st fed on normal monkey 296, which died of yellow fever after six days.

These results clearly indicate that once the infection has become established in the mosquito the subsequent ingestion of immune blood does not cause the mosquitoes to lose their infectivity. Dinger, Schüffner, Snijders, and Swellengrebel (1929) obtained similar results by feeding batches of infected mosquitoes on immune yellow fever patients. Sellards (1930), on the other hand, has reported the opposite result, but in his experiment two mosquitoes of a batch of mosquitoes that had fed on an infected animal produced a fatal infection, but another eight mosquitoes of the same batch when fed on an immune monkey failed to produce infection when fed on a normal monkey seven days later.

Although immune serum has no sterilising effect on infected mosquitoes, it prevents normal mosquitoes from becoming infected if ingested together with the virus, as shown in the following experiments.

Batch 51.—On May 13th, 1930, nine mosquitoes were fed on a mixture of hyperimmune serum 185, infected blood of monkey 349, and infected liver emulsion of 348. A little honey was added to the mixture immediately before feeding. On the 27th nine mosquitoes were fed on normal monkey 358, which showed no reaction during 10 days and when inoculated with infected blood died of yellow fever three and a half days later. On July 4th five mosquitoes remaining alive were ground up and inoculated into monkey 367, which also failed to show any reaction.

Batch 52.—On June 3rd, 1930, 11 mosquitoes were fed on a mixture of infected blood of 359, and immune serum of monkey 343, together with a little honey. On the 17th seven fed well on normal monkey 361, which failed to show any reaction.

The results of these two in vitro experiments show that the presence of a certain quantity of immune serum prevents the virus from becoming established in the body of the mosquito. The same result may be obtained in vivo when mosquitoes are fed on either human cases of the disease or infected monkeys, and the loss of infectivity to mosquitoes in such cases would seem to depend on the degree of development of immune bodies. Thus the blood of one patient (A. S.) who died of yellow fever, failed to produce infection in mosquitoes after the first day of fever, although his blood contained the virus until at least the fourth day, as shown by the results of blood inoculation into monkeys (see Sellards and Mathis, 1928).

Hudson and Philip (1929) have given particulars of some very interesting cases, of which one may be used to illustrate the course of infection in the blood of monkeys when the disease is prolonged beyond the usual febrile period of two or three days.

Details are given of a monkey infected by the bites of mosquitoes and which died of yellow fever eight days later. After two days' incubation period there were two days of fever, followed by two days when the temperature returned to normal, and finally two more days of fever before death. On each of the first seven days and twice on the last day two or three batches of mosquitoes were fed on the monkey and tested subsequently for infectivity. Of these batches of mosquitoes only those fed on the second to the fifth day became infected. One of the three batches fed on the second day, and one of the two fed on the fifth were negative, in addition to three on the first day, two on the sixth, three on the seventh, and six on the eighth.

Also each day blood was drawn off and subinoculated into other animals in doses of 0·5 and 0·05 c.cm. respectively. On the first day the larger dose produced infection whilst the smaller one failed to do so; then followed six days during which both doses were infective; whilst on the last day, at necropsy, the larger dose failed to infect whilst the smaller one produced a fatal infection.

It is reasonable to assume that in such cases the production of antibodies begins at an earlier stage of the infection than in rapidly fatal cases, and this assumption helps to explain the early disappearance of infectivity to mosquitoes. It is evident from the experiments recorded above (Batches 51 and 52) that in the mosquito the presence of immune serum neutralises a very high concentration of virus. Blood on the first day of fever generally contains 1,000,000 to 10,000,000 lethal doses per c.cm., therefore the mosquitoes used in these experiments must have ingested relatively enormous doses of virus together with the immune bodies, and in spite of this the mosquitoes failed to become infected.

When such a mixture is inoculated into a susceptible monkey the conditions are very different, as the production of passive immunity depends on the amount of immune bodies introduced. It has been found that 0·1 c.cm. of immune serum will protect a monkey against infection (Stokes, Bauer, and Hudson, 1928), irrespective of the amount of virus subsequently inoculated. Consequently in the case of blood containing both immune bodies and virus, a large dose may introduce a sufficient quantity of immune serum to protect the host against the simultaneous inoculation of virus. When a small dose is used, however, the amount of immune serum introduced will be insufficient to protect the host against the smaller dose of virus and infection will result.

It may be noted, in parenthesis, that no appreciable difference has been observed in the course of the disease whether infection has been produced by 0·000001 c.cm. of infected blood or 3 g. of infected liver. The results of these observations suggest that in later stages of the disease minute doses of the blood are more likely to produce infection in experimental animals than large ones.

Discussion.

The results of recent observations on the transmission of yellow fever leave little doubt that the disease may be carried by many other species of aëdes in addition to the yellow fever mosquito *A. ægypti*. In addition two species belonging to allied genera have been shown capable of transmitting the disease.

Although these experiments have been conducted with monkeys there seems no reason to doubt that these mosquitoes could transmit the disease to human beings, for there is such a close parallel between the course of the infection and the pathological changes in both man and monkeys that it is extremely unlikely that the infectivity of the virus should be different in monkeys. Moreover, the numerous laboratory infections with virus that has been passaged through monkeys for long periods do not differ in any respect from natural infections.

The fact that other species of mosquitoes are capable of carrying the disease suggests that in the endemic centres of West Africa antimosquito campaigns should be directed against all mosquitoes indiscriminately. It is perhaps of some significance that all except one of these additional carriers are African species, and aëdes is predominantly an African genus, for there seems little doubt that the original home of yellow fever is West Africa, from where it spread to the New World. Consequently the antimosquito campaigns in the New World have been dealing primarily with epidemics, although doubtless the disease has become endemic in some regions of South America. In West Africa conditions are likely to remain much more difficult for any permanent eradication of the disease, for apart from political and social conditions, the occurrence of widely distributed sporadic cases at varying intervals suggests the existence of extensive endemic areas where the disease exists without being recognised. This is not unlikely, for some of the laboratory infections that have been recorded showed none of the ordinary clinical symptoms of the disease, and their nature was only recognised by subinoculating the blood into monkeys.

With regard to the conditions influencing the infectivity of mosquitoes, my experiments indicate that even at 18° C. a mosquito can become infective, and also that once having acquired the infection a mosquito retains its infectivity at temperatures as low as 10°–15° C.

Although a mosquito usually remains infective for the duration of its life, and in one of our experiments was proved infective after a period of 118 days, the infection is not transmitted to its offspring. Consequently the infection cannot persist in the absence of a vertebrate host, either man or monkey. The fact that virus can pass out in the fæces of infected mosquitoes may result in some insects becoming contaminated with infected fæces during copulation, but such exceptional cases can have no bearing on the persistence of the disease in nature.

The experiments with immune sera and virus in the mosquito show that the loss of infectivity of the blood is primarily due to the development of immune bodies, and not to the disappearance of the virus. The blood ceases to be infective when the concentration of immune bodies is sufficiently high to prevent the development of the virus in the body of the mosquito. Although this period obviously varies in different individuals, it is evident that the blood is most infective at the earliest stages of the disease. Moreover, experiments on monkeys indicate that the blood is also infective during the incubation period long before the appearance of any febrile symptoms.

Such being the case, it is evident that any serious prophylactic measures must be directed primarily against mosquitoes, combined with the use of vaccine or immune serum for the protection of non-immunes likely to be particularly exposed to infection. The screening of all yellow fever patients may be desirable, but it is very probable that many of them have ceased to be infective to mosquitoes by the time the nature of the disease has been recognised. Whilst the disease, in nature, seems to be transmitted solely by the bites of mosquitoes, the blood of yellow fever patients, at least during the early stages, is highly infectious, and great care should be exercised by hospital personnel to avoid contamination of the skin with fresh blood from such cases, as the virus seems able to pass through the intact skin. After the third or fourth day of fever the blood usually ceases to be infective, owing to the presence of immune bodies, consequently there seems to be practically no danger of acquiring the infection when performing autopsies on human yellow fever cases. In monkeys, owing to the more rapid course of the disease, this is not the case, and the blood and tissues are often infective at death.

SUMMARY.

1. The incubation period of the virus in the mosquito may be as short as nine days at 28° C., or indefinitely prolonged at low temperatures. 2. *A. ægypti* is capable of becoming infected if kept at a temperature not exceeding 18° C. 3. An infected mosquito retains the infection for at least six weeks if kept at temperatures from 10° to 15° C. 4. Mosquitoes that have ingested virus, if kept at 10° to 15° C., fail to become infective, but if the temperature is subsequently raised to 28° C. they become infective. 5. In one experiment out of 11 mosquitoes that fed once on an infected monkey and were kept at 28° C. five (or six) failed to become infective, whilst five (or six) became infective. In some individuals the virus disappears from the body; in others the virus persists in the body but the bite does not become infective. 6. A fatal infection was produced by the bite of one infected mosquito 118 days after it had become infected, and there seems no doubt that once infected a mosquito generally remains infective for the duration of its life. 7. The inoculation of eggs laid by infected parents, and also of larvæ, pupæ, and adults developed from such eggs, gave uniformly negative results. 8. Males kept with infected females were found to become contaminated by the infected fæces of the latter. Such contamination was merely on the surface of the males and was removable by washing. 9. An infected mosquito remains infective after having fed on immune blood. In other words, the immune bodies have no action on the virus once it has become established in the mosquito. 10. Mosquitoes that ingest immune bodies at the same time as virus fail to become infective. The prevention of infection seems to depend entirely on the strength of the immune bodies in the blood and is independent of the ingested dose of virus. 11. As a result of (10) the blood of a yellow fever patient ceases to be

infective to mosquitoes long before the virus disappears from the blood. 12. The blood of human yellow fever patients is highly infectious in the early stages and capable of spreading the disease by percutaneous infection, since the virus is able to pass through the intact skin.

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ABSCESSES OF THE LUNG:

THEIR TREATMENT AND DIAGNOSIS.

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(WITH ILLUSTRATIONS ON PLATE.)

IN common with others especially interested in diseases of the lungs, we have been struck with the increase of suppurative conditions of the lungs coming under observation during the last few years. Whether this increase is real and due to a more frequent incidence of the disease, or whether it is only apparent, and due to greater skill in diagnosis, radiological, and pathological examinations, and a consequent greater segregation of cases to chest hospitals is a very difficult problem; the same controversy arises over intrathoracic neoplasms. For a real increase the following causes have been suggested: (1) increased operative interference on the upper respiratory tract, and (2) the influenza epidemics of 1918, 1927, and 1929, with the associated streptococcal infections in the lungs. We strongly incline to the opinion that in both cases the disease is more frequent. Though the early diagnosis in either case is difficult, the late diagnosis can scarcely be mistaken, and, as a large proportion of abscesses and all neoplasms are fatal if not surgically treated, the terminal diagnosis would have been available in most of the cases in the past.

In this communication we report on the diagnosis, course, and treatment of 27 cases treated at Victoria Park Hospital in recent years.

Ætiology.

The possible causes of lung abscess are many, and are to be found in any text-book of medicine. We do not, therefore, propose to give a list of them here, but rather to comment on certain peculiarities.

Leon Kindberg [1] considers that 50 per cent. of abscesses are primary—i.e., the primary lesion is an abscess forming in the lung. In our series 16 cases, or 60 per cent., appeared to be primary, but in ten of these cases the onset was sudden, and it is impossible to ascertain if the sudden illness was the onset of the abscess or of an influenzal condition which was followed by an abscess. Flick [2] and Lockwood [3] have called attention to the frequency of influenza as an ætiological factor, at the same time pointing out that, although pneumococcal pneumonia is cited in text-books as a relatively common cause of abscess, in their experience this has not been the case.

Clifford Allbutt's "System," 1908, quotes Tuffier's series of 49 cases, 23 of which were metapneumonic, and Aufrecht's series of 253 fatal cases of pneumonia, with three abscesses. Müller [4] supports Flick and Lockwood as to the infrequency of abscess after pneumonia of pneumococcal origin, and we are entirely in agreement with him. Only one case of our series followed pneumonia. Richardson [5] first called attention to the occurrence of lung abscesses after tonsillectomy, and Wessler [6] and Hedblom [7] in their series found that 28 per cent. and 21 per cent. respectively followed tonsillectomy. Lord's [8] figure is even higher—34 per cent. Whether lung abscess after tonsillectomy be due to infective emboli, aspiration of sloughs, or accidents of aspiration during the operation, one would conclude from experience in general hospitals that, in this country, pulmonary abscess following throat operations is not anything like so frequent as has been recorded elsewhere. In our series there were only 16 per cent., and though this low figure might be erroneous—inasmuch as lung abscess following tonsillectomy develops within five to ten days after operation and, therefore, the condition would be treated at the hospital at which the operation was performed—yet in our experience it is a condition seldom met with in a general hospital.

Lung abscess may follow any operation in which a general anæsthetic is used. In our series 6 per cent. followed general anæsthesia. This figure is also lower than that reported by other authors, but again might possibly be due to some extent to the factor mentioned above. A foreign body lodged in a bronchus is considered by American authors to be a fairly frequent cause of lung abscesses (Tucker [9]). Possibly this is due to the wider use of chewing-gum and pea-nuts in that country; one of the authors had a case (not in this series) commencing with inhalation of husks on a threshing floor. In our series only one case occurred.

Lung abscess may follow any pathological lesion occluding or partly occluding a bronchus—e.g., aneurysm, bronchial carcinoma, mediastinal glands, syphilitic stenosis, or neoplasm. Nowadays bronchial new growths are seen frequently, and not uncommonly associated with pulmonary suppuration. We have excluded several such cases from the series because the treatment is of the causative condition rather than the abscess. We might perhaps mention one case, with no cough, no sputum, and no fœtor, who

was profoundly toxæmic; at autopsy the whole lung was a foul gangrenous sac, completely occluded by a growth of the bronchus. Occlusion may occur to a lesser degree in abscess on account of pressure or turgescence of the bronchial mucosa, and may mask the symptoms.

Sex incidence.—In our series males were affected three and a half times as frequently as females; this is in accordance with the figures given by other authors.

Age.—Lockwood gives the most frequent age as between 25 and 40 years. In our series 70 per cent. occurred between the ages of 20 and 45.

Site.—The right lung was affected two and a half times more frequently than the left, the lower and mid-zone four times more often than the upper. These figures approximate to those of Lockwood, Hedblom, and Moore.[10]

Classification.

The French writers Leon Kindberg, Kourilsky,[11] Bernard and Desbucquois,[12] and Sergent,[13] describe various forms of abscess, paying particular attention to the bacteriology. The American authors do not make this differentiation, including all cases under one heading of lung abscess or pulmonary suppuration. Ballon [14] classifies as follows:—

(*a*) (1) Single abscess, with or without fluid level in skiagram; (2) bronchiectatic abscess, acute or chronic; (3) abscess associated with bronchiectasis. (*b*) Multiple abscesses which may be associated with bronchiectasis. (*c*) Secondary to new growth. (*d*) Tuberculous.

In our series the bacteriology of the sputum gave the following results: streptococci, 11 cases; streptococci and pneumococci, 5 cases; pneumococci, 2 cases; streptococci, spirochætes, and fusiform bacilli, 8 cases.

We were unable to differentiate the abscesses bacteriologically, but all the cases with spirochætes in the sputum, with one exception, were long-standing chronic cases. We favour Ballon's classification because, by means of lipiodol injection of the lungs, it is possible to distinguish these various conditions, and because the various classes require different treatment. Our series can be grouped as follows: single abscess, 20 cases; abscess associated with bronchiectasis, 1 case; bronchiectasis with abscess, 2 cases; multiple abscess with bronchiectasis, 2 cases.

Symptoms and Signs.

In acute cases the disease commences with a sudden onset of fever and malaise, and there may be rigors. Cough develops early; at first dry, it gradually becomes looser, and small quantities of muco-purulent sputum are raised. As the abscess makes communication with a bronchus the sputum becomes purulent and is brought up in large quantities. This large amount continues for some days, and then gradually falls to a lower level, at which it remains constant. Sometimes it will cease for a time, to be brought up again suddenly in large quantities; this is due to temporary occlusion. The odour of the sputum is usually offensive from the time it becomes purulent, but this is variable and the sickening smell may not develop until the abscess has become chronic, and secondary infection with anaerobic organisms has taken place. It is rarely that the sputum does not become foul. The amount varies, the smallest in our series being half an ounce daily, the largest 30 ounces, and the average between 5 and 10 ounces daily.

Fever is usually present, and is often increased with the retention of sputum. Rigors and chills may occur; 12 of our cases had fever up to 101° F., ten had a high swinging temperature, and four were afebrile whilst under observation; but in three of these the abscess had been evacuated through a bronchus before admission and healing was taking place. Hæmoptysis may occur early from congestion in a bronchus, and is an initial sign of the evacuation of an abscess through a bronchus. It usually occurs later in the disease; 24 per cent. of our cases had hæmoptyses, two severely, and one fatally.

There are no physical signs characteristic of the disease. Impairment of percussion note is constant, frequently with some flattening of the affected side. Most commonly the signs are those of consolidation, occasionally of cavitation, and the breath sounds correspond, but in some cases are weak or absent; while, if an abscess cavity be present, the signs vary from day to day as the cavity fills and empties. The signs may be only those of effusion, if this be present. Coarse clubbing of the fingers occurred very frequently (70 per cent.) in our series. It is a matter of some surprise how seldom this has been noticed by the patient; we have known only one patient—a young woman (not included in this series)—remark on it. Flick has pointed out the rapidity with which clubbing may occur; we ourselves have seen marked clubbing disappear in a week after irradiation, in a case of mediastinal lymphadenoma.

Leucocytosis is usually present. In our series 18 per cent. had over 30,000 white cells, 50 per cent. had between 20,000 and 30,000 white cells, 22 per cent. had 15,000 white cells, and only 2 per cent. under 10,000.

Early in the disease there is no marked wasting, but if the condition goes on untreated the fever, cough, and anorexia produced by the foul exhalation lead to marked emaciation.

Complications.

The most common complication is a pleural effusion, which may be serous or purulent. Pyopneumothorax may occur and, if the pleura becomes infected, a broncho-pleural fistula may cause complications. We have seen this occur in our series in one case, and as a result of treatment. Cerebral abscess is rare; we have seen it only twice, and it was not a complication in any of the cases recorded.

Diagnosis.

The possibility of a lung abscess must always be considered when, following on the acute onset of a respiratory illness, about the tenth to the fourteenth day a large amount of purulent sputum (which may or may not be offensive) is coughed up. A missed empyema is seldom evacuated via a bronchus as early as this. The history is not always spontaneously given, and must be carefully inquired into when investigating a case of this type.

The conditions most often confused with lung abscess are pulmonary tuberculosis, interlobar empyema, new growths, bronchiectasis, gumma, and purulent bronchitis. If the lesion is in the mid-zone or basal portion of the lung and unaccompanied by apical signs it is unlikely to be tuberculous, but if it is in the upper lobe the similarity with tuberculosis may be very great, particularly if the patient has had a hæmoptysis. Two of our cases had been sent to sanatoria. Levald and Green,[15] Flick, Singer, and Graham [16] have called attention to this confusion with tuberculosis. Radiology and repeated sputum examinations will exclude this disease.

In interlobar empyema the history, physical signs, and radiological picture may be very similar to those

of abscess. The character of the sputum may help, and the rupture is usually later in the disease. Though it would seem that an interlobar or simple empyema discharging through a bronchus approximates very nearly to a lung abscess, yet the condition commonly clears up rapidly without much evidence of infection of the parenchyma of lung. Leon Kindberg, Sergent,[17] and Kourilsky [18] believe that lung abscesses are of much more frequent occurrence than interlobar empyema; this is also our experience.

A carcinoma in the parenchyma of the lung usually produces much hæmoptysis and no pus. A bronchial carcinoma in the early stages is comparatively easy to diagnose, and fever is not present; in the later stages, when bronchiectasis or abscess has occurred in the collapsed lobe, differentiation is impossible, but the history is always of some length and antedates the fever and excessive expectoration considerably. New growth is frequently accompanied by supraclavicular glands, and bronchoscopy should be done on all doubtful cases.

The physical signs, history, and radiological appearance of gumma may be very similar to those of abscess, but the Wassermann reaction and therapeutic test are sufficient to establish a diagnosis.

Bronchiectasis is distinguished by its long history (though periods of high fever may occur there are long apyrexial periods), by an absence of leucocytosis, and, if the bronchiectasis is associated with an abscess or a bronchiectatic abscess is present, by radiology.

BRONCHOSCOPY.

American authors consider this method of very considerable use in diagnosis. Miller,[19] Graham,[20] and Jackson [21] consider it should always be done in the hope that it may reveal a foreign body, the removal of which greatly facilitates the cure. In five of our cases it was done as a diagnostic procedure, and in each case was successful in definitely confirming the presence of an abscess; in three cases it was useful in giving negative information concerning new growth.

RADIOLOGY OF LUNG ABSCESS.

The radiological findings are not characteristic. There is usually a shadow with a diffuse margin, except where the abscess may come in contact with the pleura, at which point the shadow becomes sharply defined. A similar shadow may be found in tuberculosis, neoplasm, atelectasis, infarct, or interlobar empyema (Pancoast [22]); 19 of our cases showed this type of shadow, which may be modified by such conditions as pleural effusion. Less commonly the skiagram shows a cavity in which a fluid level may be seen (eight cases), but here also the diagnosis cannot be made on the plate alone.

We wish to emphasise the fact that the diagnosis of lung abscess is made on the history, physical signs, and examination of sputum; the X rays are of use in confirming these signs, but their main function is to locate the position of the abscess and assist in its classification—both points of great importance when considering the treatment.

An anteroposterior view shows if the lesion is in the region of the hilum or the periphery. A lateral view shows if the abscess is anterior or posterior; in 13 of our cases a lateral view was of the greatest assistance in localising the abscess. Lipiodol injection of the bronchial tree aids in localisation and in the exclusion of bronchiectasis in the other lung, but is mainly of use in classification. Mostly the lipiodol does not enter the abscess but passes into the bronchi around it, thus assisting in localisation. It marks out the bronchiectasis which may be associated with an abscess. In those cases in which the bronchiectasis is primary, with a secondary abscess, the lipiodol shows the bronchiectasis but does not enter the abscess (Ballon). Rarely the lipiodol will enter to show multiple abscess cavities, a finding of considerable importance from a therapeutic standpoint.

Medical Treatment.

No definite rule for treatment can be laid down. Each case must be considered individually and attention paid to the condition of the patient, the nature of the abscess, and its position and duration. A number of acute abscesses will heal by medical treatment alone, and surgery should not be called in until all hope of obtaining a cure by medical means has been abandoned. Medical treatment consists of rest in bed, measures to support the patient's general condition, especially the heart and circulatory system, postural drainage or drainage through a bronchoscope.

Graham, Lambert,[23] Müller, Lord,[24] Bernard, Dreyfus, Desbucquois,[25] and Leon Kindberg have all pointed out the tendency to spontaneous recovery in acute cases. In our series five cases recovered thus.

Various drugs have been employed to assist in resolution.

Emetine.—Sternberg,[26] Laederich and Paumeau-Delille,[27] and others have used this drug with success. In our series it was used in two cases, where we believe that it assisted materially in their recovery. In one case the patient felt greatly benefited, and was much less toxic after treatment, but we do not think it was of any substantial service. Three cases were not benefited. The dosage is gr. 1 daily for 8 to 12 days, preferably combined (as suggested by one of us (A. J. S. P.) in amœbic dysentery) with strychnine gr. 1/30 to prevent the depressant action on the heart muscle.

N.A.B. (given intravenously).—Smith [28] and Archard and Soulie [29] report good results, especially in those cases with spirochætes in the sputum. Three received this treatment; in one the result was most satisfactory, but in the others no result was obtained.

Lipiodol.—We have found that in bronchiectasis the intratracheal injection of lipiodol often has a beneficial effect; in one case lipiodol injection was given three times as a therapeutic measure, and seems to have assisted recovery.

Nine cases recovered on medical treatment alone.

Surgical Treatment.

Müller, Hedblom, Lord, Kern,[30] Lockwood and Kindberg all agree that an acute lung abscess should be treated on medical lines for two or three months before any surgical intervention, but that delay must not be undue if improvement does not take place. Surgical treatment consists in compression or direct drainage. Artificial pneumothorax has been advised as a means of treatment by many authors: Bredow,[31] Jacobaeus,[32] Tewksbury,[33] Forlanini,[34] and Goldberg and Beisenthal.[35] Others—Krampf [36] and Müller—have advised against it.

Artificial pneumothorax is worth a trial when there is an encapsulated abscess deep in the lung (in one such case we had a good result), and also probably in the diffuse type of abscess when the attendant risks of this procedure and of the more severe thoracoplasty are not very unequal. Generally in those cases where the abscess is near the periphery a pneumothorax will cause a pyopneumothorax—usually considered a grave complication. This complication occurred in four of our cases; in one it resulted from

thoracoplasty. One died; the other three, after drainage, made a complete recovery. In one case (a chronic abscess) artificial pneumothorax was carried out for five months with some improvement, but the condition is at present not cured. Of five cases treated by artificial pneumothorax, one was cured directly, two were cured after drainage and pyopneumothorax, one is still under treatment, and one died.

Phrenic avulsion.—Falta [37] has treated four cases by this method with success. We have not used it as a curative measure, but in one case it was used as a palliative. The patient being extremely ill with severe hæmoptysis, it was feared that direct incision might be fatal; the hæmorrhage ceased and drainage was successful later.

Thoracoplasty.—This was only used in two of our cases. One died after a few days of broncho-pneumonia in the sound lung; the other developed a pyopneumothorax and recovered after drainage. We agree with Sergent, Baumgartner, and Kourilsky [38] that the operation is most successful in dealing with a cavity left after drainage.

Drainage.—By this we mean direct drainage of the abscess. We believe that this operation is best done in two stages. The first stage consists of resection of the rib; the pleura is sewn, if it is not adherent, and packed. The second stage should be proceeded with after five to ten days; the abscess is opened with knife or cautery and a drainage-tube inserted. If the pleura is firmly adherent at the first stage drainage may be completed at once. Brauer,[39] Meyer,[40] Hewer and Macbready,[41] and others are in favour of this method of procedure. We consider the operation is best carried out under local anæsthesia. Four cases were treated in this way; two made an uninterrupted recovery, one died soon after operation, and one improved, but the drainage closed and the patient died of pneumonia at a later date. The dangers of the operation are shock and hæmorrhage; the latter did not occur in our cases.

For multiple abscess and bronchiectasis associated with abscess, lobectomy and cauterisation is advised by Singer and Graham, Sergent, Baumgartner, and Kourilsky. We have had no experience with this operation.

Results.

The following table summarises the results of medical and surgical treatment:—

Form of treatment.	No. of cases.	Satisfactory.	Improved.	Not benefited.	Died.
	14	11	1	—	2
Medical—					
Spontaneous recovery..	—	5	—	—	—
Emetine..	6	2	1	3	—
N.A.B.	3	1	—	2	—
Lipiodol	1	1	—	—	—
General treatment ..	7	7	—	—	—
Surgical—					
Artificial pneumothorax	5	3*	1	—	1‡
Phrenic avulsion	1	—	1	—	—
Thoracoplasty	2	1†	—	—	1
Direct drainage	4	2	1	—	1

* Two after pyopneumothorax. † After pyopneumothorax. ‡ Pyopneumothorax.

The mortality-rate in lung abscess is given by various authors as from 58 per cent. in medically treated cases to 35 per cent. in those surgically treated. Singer and Graham report a surgical mortality of only 32 per cent. The variation depends largely on the number of cases which have become chronic before coming under observation. In our series the mortality-rate of those requiring surgical treatment was 43 per cent.

Conclusions.

1. In the diagnosis of lung abscess a careful history, physical examination, and pathological investigation of the sputum are all important.

2. Radiology is of most use, not in diagnosis, but in location, classification, and in following the result of treatment.

3. An acute lung abscess should, for a period of six to ten weeks, be medically treated with postural drainage, during which time emetine, N.A.B., or other drugs may be employed. If, after this period, the condition is not clearing, surgery must be resorted to. If the case when first seen is judged from the history to be of longer standing than six to ten weeks, it should be considered as chronic, and surgical treatment proceeded with.

4. Artificial pneumothorax can only be regarded as safe in the deep-seated encapsulated abscess; its use in other cases must be carefully considered in regard to the comparative risks.

5. The operation of choice is direct drainage performed in two stages under local anæsthesia.

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Note.—Since this paper was written an interesting article has been published in the *Journal* of the American Medical Association (Sept. 13th) by H. J. Spector, stressing even more than we have done the advisability of medical treatment.

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TWO CASES OF ACUTE SILICOSIS,

WITH A SUGGESTED THEORY OF CAUSATION.

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With a Note on the Chemical Examination of the Lung by

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E. A. Rudge, M.Sc., F.I.C.

THE present inquiry arose out of the death of two girls working in a London factory. They had been employed (Case 1 for 2¾ years and Case 2 for 4¼ years) in packing a cleaning-powder containing ground silica, and since death could only be attributed to their occupation, the cause of death was described as "industrial silicosis."

The cases attracted a good deal of medical interest at the time, and offer noteworthy features for comparison with the usual type of silicosis. They occurred in young females after a relatively short period of exposure to the silica dust, and in both cases death ensued very soon after the onset of the first symptom. The following clinical and pathological notes will serve to draw attention to the unusual features.

Report of the Cases.

CASE 1.—A girl, aged 17, attended Battersea Tuberculosis Dispensary for the first time on April 27th, 1928, complaining of slight cough and pain in the chest. She gave a history of cough for one week before Christmas, and for five weeks before attending the dispensary. She had had no previous illnesses, and there was no family history of tuberculosis. She was somewhat poorly nourished and anæmic, and complained of slight shortness of breath on exertion, but there was no marked dyspnœa. On first examination her temperature was 100·4° F., and her pulse-rate 124. No tubercle bacilli were found in her sputum, which was scanty and brought up with difficulty. There was markedly diminished movement of the right lung with marked impairment of the percussion note at the right base. The breath sounds at the base were bronchial in character, and there were numerous superficial crepitations.

She was admitted to St. James' Hospital, Balham, on April 30th, and her condition deteriorated rapidly. Dullness was present in both lower lobes, and spread upwards while she was in hospital. The breathing over the dull area became tubular, with much increased vocal resonance and whispering pectoriloquy, and there were many fine superficial crepitations. She became markedly dyspnœic and cyanosed and had a swinging, irregular pyrexia all the time. Her sputum, which was always scanty and mucoid in type, was examined on three occasions, but no tubercle bacilli were found. On June 3rd her condition became much worse, with very urgent dyspnœa and intense cyanosis, and she died in hospital on June 4th.

Post-mortem Examination.—The lungs showed no collapse on opening the thorax, though there were no adhesions. When removed from the body they were bulky and very heavy, and preserved their correct anatomical shape. The surface was covered with a fine, granular, pleural exudate under which the lung appeared grey in colour, speckled with small lighter-coloured dots. On section they were extremely tough, grating as the knife went through the tissue. The lower lobes appeared to be completely solid, except for small areas at the apices which still contained air. They were of a greenish-grey colour, resembling in a general way some kind of marble. They were dotted with innumerable tiny pinhead nodules of a lighter grey colour. The upper lobes still contained air, but were tougher than normal and studded with small, bluish-grey nodules about the size of a pin's head. The bronchial, mediastinal, and some of the cervical glands were much enlarged, extremely tough, and showed on section a similar marbled appearance. The heart showed recent fibrinous pericarditis, but the other organs showed nothing noteworthy.

Microscopical Report.—The lung showed numerous large fibrotic patches which were practically a-cellular. Surrounding these patches was a comparatively intense small-celled infiltration. In the interstices of these fibrotic areas there was a finely granular black or brown deposit. The alveolar tissue was much reduced. The alveolar walls were much thickened with fibrous tissue, while the lumen of the alveoli was filled, in most instances, with an albuminous exudate enclosing desquamated cells and a finely granular substance. There was no histological evidence of tuverculosis and stained sections showed no bacilli.

CASE 2.—A woman, aged 19, attended the Battersea Tuberculosis Dispensary for the first time on May 3rd, 1928. She was fully employed at the factory until the time of her first visit to the dispensary, and was only persuaded to attend as the result of a routine examination of the employees of the factory by a medical officer. She was very poorly nourished, and complained of slight cough and pain in the chest of a week's duration. Her only illness was an attack of pleurisy a year previously. Her father had died of pulmonary tuberculosis. There was no evidence of dyspnœa on the first examination, and no cyanosis.

On physical examination the movement was slightly less at the left base, the percussion note was impaired at the right apex and left base, and crepitations were heard at both bases. The sputum, which was scanty, was examined, but no tubercle bacilli were found. The radiologist's report was: "suggestive of miliary tuberculosis." She was recommended for institutional treatment for observation, with a provisional diagnosis of ? silicosis, ? miliary tuberculosis, and was admitted to Brompton Hospital on June 1st. We are indebted to the Medical Committee at Brompton Hospital for permission to use the following notes on her condition while an in-patient there:—

"Looks very ill, breathing rapidly and cyanosed. Pulse regular and feeble, pulse-rate 140–160. Spleen just palpable. Respiration rapid, note impaired over both apices, especially the right behind, and over the right base. Breath sounds generally harsh. Bronchial breathing over the right apex in front, over middle zone of right lung behind, and a patch of very high-pitched bronchial breathing by the angle of the left scapula. Fine and coarse râles and some rhonchi heard all over the right lung, and some fine râles over the left lung. Respiration-rate 50–60. Albumin present in the urine. On admission she was emaciated, with slight cough and very marked dyspnœa. Whilst in hospital her temperature varied between 100° F. and 103° F. She gradually became weaker with very marked dyspnœa and cyanosis and died on June 16th."

Post-mortem Examination.—The lungs in this case showed a similar but less marked condition to those in the previous case. The fine grey nodules were prominent but there was no massive fibrosis of the lobes. The lungs showed no sign of caseation and no giant-cell systems were found to be present in sections, but sections stained by the ordinary method showed tubercle bacilli.

Nature of the Disease.

From the foregoing clinical and pathological data it will be evident that the disease from which these girls died is definitely different either in kind or in degree from that previously encountered and recognised amongst workers in such dusty trades as mining, stone-cutting, and the manufacture of pottery. At the same time, it is equally certain that the ground silica used in the manufacture of the cleaning-powder handled by the girls was essentially the same in all important respects as that occurring in these other trades. One is therefore forced to the conclusion that the deaths cannot have been caused by the inhalation of silica dust alone, and that the other ingredients of the powder must be held responsible for the unusual features of these cases. It is contended that this conclusion is logically inevitable, irrespective of whether the mechanism of the disease now suggested is eventually substantiated or disproved.

All living creatures, animal and human, primitive and civilised, continually inhale varying small quantities of silica in the form of sand and road dust. Since this does not accumulate it must be absorbed in some way, presumably as colloidal silica, which is taken up in the blood stream and passed out of the body.

It is now possible to consider what modification of this colloidal process is likely to be caused by the deposition, with silica, of the other ingredients of the cleaning powder. This powder contained about 75 per cent. pure silica, the remaining 25 per cent. being soap powder containing sodium carbonate and soap. What is likely to be the result when crystalline silica is converted to colloidal silica in the presence of sodium carbonate? The answer is fairly certain, and twofold. (1) The colloidal silica and soda will combine, giving sodium silicate, or soluble soda glass, having an approximate formula Na_2SiO_3. (2) Owing to the presence of Na_2CO_3, colloidal silica in the "sol" form will be rapidly converted to the "gel" condition. Since there is more than enough silica in the dust to satisfy all the soda, it is more than probable that both of these reactions will occur.

The chemical conditions in the lung tissues are now entirely different from those occurring when pure silica is deposited. Colloidal silica does not react in any notable manner with salts of, say, calcium and iron. On the other hand, sodium silicate immediately reacts with calcium and iron salts in solution, giving precipitates of the respective silicates, which are insoluble. It is particularly noteworthy that the iron silicate obtained in this manner is green in colour, and this fact accounts in at least a reasonable way for the green colour which was a special feature of the lungs. It may be objected that the quantity of iron salts present in the blood is extremely small. This is perfectly true, but the ground silica of commerce itself contains appreciable quantities of iron. A certain small percentage is present in the original stone, and a quantity is added by abrasion from the crushing and grinding machinery.

The suggested progress of the disease may, therefore, be set out in stages: (1) Silica dust is deposited in the lungs and converted to colloidal silica. (2) Colloidal silica reacts with sodium carbonate, also present in the dust, giving sodium silicate and causing the excess of the colloid to assume the "gel" condition. (3) Sodium silicate reacts with calcium, iron, and other salts present in solution, giving precipitates of insoluble silicates. (4) The deposition of insoluble silicates is cumulative, and continually builds up a film or layer of increasing thickness; at the same time the "gel" colloid is more slowly absorbed than the "sol," and adds to the condition of general congestion. (5) At a certain stage the deposited layer becomes dense enough to prevent the normal function of the lung in converting silica to colloid, and from this stage onwards the silica dust deposited will accumulate in its original state.

Should the foregoing hypothesis be correct, an examination of the lung tissue should reveal a kind of stratified formation, somewhat in the following manner: (1) Layer of insoluble silicates, greenish in colour from iron. (2) Layer of insoluble silicates, in a matrix of gel or amorphous silica. (3) Layer of pure sandy silica which the congested lungs have been unable to convert to colloid.

The same process will account satisfactorily for the extensive and very rapid fibrosis. If mineral matter is deposited over a wide area of lung tissue in small but regular quantities and is not absorbed, the consequent irritation must inevitably give rise to rapid fibrosis over the whole area affected. This fibrosis would add to the general stagnation and hasten the stage where natural absorption of silica is ultimately prevented.

The action of the soap present in the powder has not been taken into account, since the alkali appears to provide all the explanation necessary, but it is quite possible that the colloidal nature of the soap itself may have some bearing on the problem, especially in the more advanced stages of the disease.

Chemical Examination of Silicotic Lung.

(DR. ARNALL AND MR. RUDGE.)

In the first case it was believed that the crux of the problem from the chemical point of view was to determine whether the silica in the lung was present in the free state (in broken crystalline particles as inhaled) or whether it was combined with iron and perhaps calcium in the form of amorphous and relatively insoluble silicates. In actual practice the problem was complicated by the fact that the lung had been preserved in a formaldehyde-acetate mixture, which by oxidation would contain free acids, such as formic acid. It follows that even if all the silica in the lung had been in the combined state, immersion in the preserving mixture would have caused a tendency for the following reaction to take place:—

Combined silicates + formic acid
$\rightleftharpoons$ Formate + silicic acid (colloidal).

The extent of the reaction or the position of equilibrium is dependent upon the solubility of the silicate present and the concentration of the acid.

The examination was therefore attempted in the following way: (1) Determination of total silica. (2) Determination of combined silica. (3) Determination of colloidal or precipitated silica. (4) Determination of free crystalline, or original silica.

Further experiments were carried out on the absorption of soluble silicates by lung tissue, in order to ascertain to what extent the silica was fixed by substances present in the lungs.

EXPERIMENTAL RESULTS.

General Observations.—The silica content of the lung varied considerably with locality. In the region of the main air ducts the proportion was much higher than in more remote tissue. All the results given are calculated on lung tissue dried to constant weight at 105° C. The loss of weight on drying was approximately 60 per cent.

Total Silica.—The dried lung was digested in nitro-sulphuric acid until all organic matter had been oxidised. The precipitated silica was ignited in a platinum crucible, and the loss of weight on volatisation with hydrofluoric acid recorded as silica.

Amounts of Silica obtained from 100 g. of Dried Lung.

(*a*) Remote area	0·65 g.
(*b*) Intermediate area	1·09 ,,
(*c*) Vicinity of main ducts	2·70 ,,

Combined Silica.—Silicates on reaction with dilute acids give colloidal silicic acid, which is soluble. The finely divided tissue was, therefore, refluxed with an aqueous-alcoholic solution of hydrochloric acid until it was completely disintegrated. The relative amounts of soluble and insoluble silica were then determined, and results showed that about 15 per cent. of the total silica was still in the combined state. This result was confirmed by microphotographic examination, using polarised light, of sections of lung cut by microtome from the frozen material. When a section including small air-channels was examined, it was observed that, in some cases, bands of mineral matter were present, more or less concentric with the air ducts. Thus, when the nicols were crossed, the whole field became dark with the exception of these bands, which were slightly luminous but showed no characteristic crystalline form.

Colloidal or Precipitated Silica.—The colloidal or precipitated silicic acid, produced by decomposition of silicates formed in the tissue, was determined approximately and with difficulty, but it should be borne in mind that its presence is indicated rather than definitely proved. Unless natural silica is in an extremely fine state of division it is not dissolved by very dilute caustic alkalis, while the colloidal acid is soluble. Digestion of the tissue in such an alkaline solution would result in all the combined and colloidal silicic acid being dissolved, while crystalline silica would not go into solution unless it were in a very fine state

of subdivision. Experiments showed that considerably more silica was so absorbed than was accounted for by the determined amount of combined silica plus the fine silica which could be extracted in a similar manner from the original product. It should be noted, however, that the dust absorbed by inhalation would contain a relatively high proportion of fine particles.

Special sections were stained in an attempt to show the colloidal matter microscopically. It is known that colloidal silicic acid will absorb ferrocyanides which cannot be removed by washing, and that on further treatment with ferric chloride the silicic acid is rendered visible by the precipitation of Prussian blue. This result was actually obtained, but must be accepted with reserve, since it might conceivably have been derived from other colloidal material present in the lung.

Original Crystalline Silica.—The presence of this was conclusively shown by microphotographic observation. The particles became apparent by polarised light, and were of the shape and type of the larger particles in the powder inhaled by the deceased.

Other Experimental Results.—Experiments were also made with lungs removed from sheep and pigs immediately after slaughter. These were immersed in dilute solutions of sodium silicate. It was found that silicates were formed in the tissues and precipitated therein, and that they were not subsequently removable by washing. The amount of silica combined in this way was very considerable. The presence of silica in lung material so treated implies precipitation of insoluble silicates, but in the case of a living creature the presence of carbon dioxide might be sufficient. Silicic acid is a weaker acid than carbonic acid, and in the reaction: $Na_2SiO_3+CO_2+2H_2O \rightleftharpoons Na_2CO_3+SiO_2.2H_2O$ (colloidal) the resultant colloidal silicic acid would not, in all probability, diffuse through tissue permeable to crystalloids.

CONCLUSIONS.

The results of the experiments outlined above indicate the presence in the affected lung of: (1) Combined silica. (2) Free silicic acid derived from combined silica. (3) Original crystalline silica. It should be noted that the amount of iron found in the lung was sufficient to satisfy the combined silica present.

Significance of Above Observations.

(MR. GILDER, DR. MACDONALD, AND DR. PIGGOT.)

The results of the chemical examination appear substantially to bear out the mechanism and sequence set out in the theory. It has not yet been clearly shown, however, whether the disease operating in these cases is definitely different in nature from ordinary silicosis or whether it is merely silicosis under the most unfavourable conditions progressing at the maximum rate. It may well be that the explanation given of the cases under review is at the same time an indication of the actual mechanism of silicosis due to pure silica dust. If rapid silicosis results from the inhalation of silica dust with ample supplies of alkali, slow silicosis could conceivably be brought about by the reaction of inhaled silica with the comparatively small quantities of alkali normally present in the lungs.

If the theory outlined is correct, it indicates how the future occurrence of silicosis in this rapid form may be definitely prevented. If steps are taken to ensure that silica dust is never inhaled at the same time as alkaline dust, the risk involved in the handling of silica is immediately reduced to that of ordinary silicosis, which is infinitely less rapid and fatal. In this connexion it is interesting to recall that the soap powders of commerce are of two separate and distinct kinds. In the one case, hard soap is dried, ground, and mixed with the required quantity of ground, anhydrous sodium carbonate. Such a soap powder is very light in texture, and forms dust clouds with little agitation. The other form of soap powder is made by a wet process, in which soap and alkali are dissolved and crystallised together from solution. The dried product contains about 40 per cent. of water and is of a somewhat coarse, heavy texture, requiring great agitation to form a cloud and settling rapidly. It is suggested that a regulation prohibiting the use of any but "wet process" soap powders where admixture with silica is to be carried on would reduce the risk of silicosis to negligible proportions.

It is interesting to note that the occurrence of "alkaline" silicosis is independent of the quantities of dust inhaled, since the effect is cumulative. As has been noted, small quantities of pure silica can be dealt with by the body and, as long as a certain factor of safety (presumably varying with the individual) is not exceeded, little or no harm is done. If, therefore, in any works using pure silica a suction plant continually keeps the concentration of dust below the safety limit, the risk of silicosis is totally eliminated. In works using mixed dust, however, there is no factor of safety except the total prevention of alkaline dust, since the smallest possible addition of this to the silica dust will give rise to the chemical reactions outlined above. The use of a form of alkali which does not readily form a cloud is, therefore, of considerable importance.

CLINICAL AND LABORATORY NOTES

A CASE OF PATHOLOGICAL FRACTURE DUE TO MALIGNANT METASTASIS:

CURE BY DEEP X RAY THERAPY.

BY F. HERNAMAN-JOHNSON, M.D. ABERD., D.M.R.E. CAMB.,

HON. RADIOLOGIST TO THE FRENCH HOSPITAL; PHYSICIAN IN CHARGE OF THE X RAY AND ACTINOTHERAPY DEPARTMENT AT CROYDON GENERAL HOSPITAL.

(WITH ILLUSTRATIONS ON PLATE.)

UNTIL comparatively recently, fractures due to invasion of bone by metastasising breast cancer were considered almost hopeless. It is true that a few of them united spontaneously when treated on ordinary lines, but, in general, no attempt at union occurred, and a series of radiograms showed a progressive eating-away of bone by the metastatic growth. To take an entirely pessimistic view under such circumstances is no longer justifiable. By the judicious use of deep X ray therapy union may sometimes be brought about, and this is well worth doing, because a patient is not necessarily near her end when a single bone metastasis develops, but may live for years in good health. The following case is of interest.

A married woman, aged 42, was admitted to hospital on May 31st, 1928, suffering from a fracture of the right hip. The history was rather vague. The patient was out shopping, and thinks she caught her toe in some inequality in the floor. She fell on her right side and was unable to get up again. On admission she was sent at once to the X ray department, and a radiogram showed a fracture of the femur, just below the trochanter (see Plate, fig. I.).

Six weeks later she was discharged from the hospital wearing a Thomas's splint. A radiogram was taken just before her departure (fig. II.), and showed the deformity corrected, and the position good. It also showed pronounced rarefaction of the bone in the neighbourhood of the fracture. The significance of this appearance was not grasped at the time.

On Oct. 29th, rather more than three months after her discharge, she was readmitted, as it was obvious that no progress was being made. A further radiogram (fig. III.) showed a worm-eaten appearance of the whole of the upper end of the femur except the head. The history was then gone into afresh, and it transpired that the patient had suffered from breast cancer, and a radical removal of the left breast had been carried out in 1925. The nature of the condition was now clear, and it was decided to try deep X ray therapy. Her first treatment was given on Nov. 5th, 1928, and she had various courses until July, 1929. On this date an examination with X rays was made, and the report was as follows: "There is very definite consolidation; the fracture due to the metastatic invasion appears to have united." After this the patient began to walk with crutches. By January of this year she had discarded these in favour of a walking-stick. A final radiogram (fig. IV.) showed complete consolidation in good position, with "Shenton's curve" almost restored to normal (see figs. III. and IV.).

Points especially worth noting in this case are:—

(1) As is so often the case in pathological fractures, there was no violence in the ordinary acceptance of the term. Where an injury to bone appears to be disproportionately large, relatively to the apparent force used, it is wise to bear in mind the possibility of pathological fracture. Even had the story of the breast operation been elicited on admission, I do not think that pathological fracture could have been definitely diagnosed from the first radiogram (fig. I.). But such a history, in conjunction with fig. II., could scarcely have failed to raise the question. The surgical and radiographic departments (the latter my own) must share whatever blame the righteous may apportion.

(2) Despite the fact that the metastatic growth was allowed to progress unchecked for five months after the fracture, it proved possible to bring about sound union with a good functional result within a year's time. It is reasonable to suppose that an immediate diagnosis, followed by similar treatment, would have effected a cure in a few months—that is to say, the patient lost a year of active life.

(3) It is impossible to say, as yet, what proportion of fractures due to metastatic growths will unite under deep X ray treatment. In no case, however, should the patient be denied the chance of benefit. To adopt a *laissez-faire* attitude, on the ground that nothing matters much because the patient's days are in any case numbered, is quite unjustifiable. The occurrence of a metastatic deposit in a long bone is by no means an immediate death-warrant. At the time of writing (Oct. 13th, 1930) the patient described is in good health, has discarded her stick, and says that, if necessary, she can run a short distance. As she is the mother of a young family, every year that can be added to her active life is of great value. Better still than treating pathological fractures is to forestall them. The presence of metastatic growth is sometimes indicated by aching of the limb, and an X ray examination should be made of the pelvis and femur in all patients who make any complaint of sciatica or rheumatism after operations for cancer. A certain number will be found to be suffering from malignant invasion of bone, and it may prove possible to effect a local cure.

In conclusion, I should like to lay stress on the fact that the healing rate of a pathological fracture, no less than of an ordinary one, may be affected by constitutional factors. A patient in a poor state of general health has less resistance to cancer, as to other diseases. All means which assist in "building up the system" should therefore be employed, and amongst these treatment by ultra-violet light occupies a very important place.

A CONTINUOUS "EVERSION" STITCH.

By Arthur Edmunds, C.B., M.S. Lond., F.R.C.S. Eng.,
Surgeon to King's College Hospital.

Some years ago I introduced a suture which, after drawing the deeper parts of the wound together, also passed through its extreme edges. The object of this was to prevent inversion and secure an accurate adjustment of the cut surfaces.

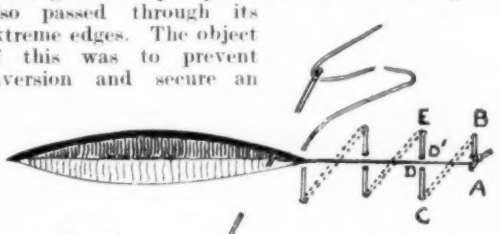


Fig. 1.

The following is a description of a modification of this stitch. It is a continuous suture, and can be inserted quite easily and quickly. The method of doing this will be readily understood by studying the figures.

The suture is commenced at the right hand of the incision by putting in a stitch which takes up very little tissue. This is tied lightly, and the short end cut or clamped (Fig. 1, A). The needle is then inserted at B and passed obliquely to the left, emerging at C about half an inch further along the wound. The stitch is then passed at right angles to the wound, picking up the extreme edges of the divided skin at D D'. The needle enters the tissues again at E and is passed obliquely to the left as before until the wound is closed. The thread is then fastened off with a lightly tied stitch, similar to that with which the suturing commenced.

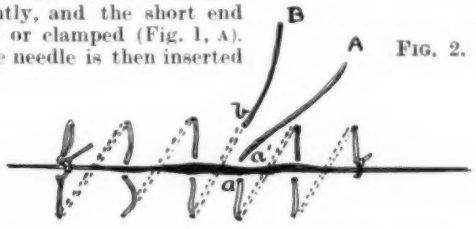


Fig. 2.

If a fresh thread is needed the needle is unthreaded after it has passed through the extreme edges of the wound, and the second thread started by passing it obliquely and to the left. In the diagram (Fig. 2) the first thread A is shown emerging at *a a'*, and the second thread B entering at *b*. Sewing with this second thread is then carried on until the wound is closed. The suture is then finished off as before.

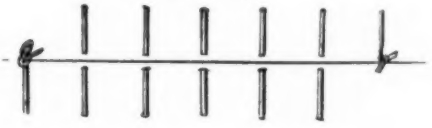


Fig. 3.

The two loose ends of the threads A and B are then tied together, any adjustment of the tension being made at the same time. If the edges of the

wound are everted and not in apposition they can easily be adjusted with a swab or a pair of forceps, and when this has been done they remain in position. Fig. 3 shows the appearance of the suture line when completed.

A UNIQUE SURGICAL RECORD.

By R. G. Clements, M.D.R.U.I., F.R.C.S.E.

The following case is surely a unique record of operations performed on one patient within 14 years.

Mrs. A. B., aged 43 years, consulted me first on June 21st, 1922. She gave a history of stomach trouble with vomiting of bile and always accompanied by severe frontal headaches; during the previous four months she had uterine hæmorrhage, her menstrual periods having been regular up to that time.

History.—Her previous history showed that she had a cholecystotomy performed in 1916 in the Manchester Royal Infirmary, when a large single stone was removed and the gall-bladder drained. She felt much better after the operation until 1918, when she had a return of gastric pain. This was diagnosed as a duodenal ulcer for which a posterior gastro-enterostomy was performed. No benefit resulted from this operation. I found her markedly tender over the gall-bladder and pyloric region, and on vaginal examination she was found to have a typical malignant cervix. I recommended immediate operation and performed a hysterectomy (Wertheim) on June 26th, 1922. She unfortunately developed a vesicovaginal fistula which was repaired by me without difficulty in August, 1922.

In April, 1923, I performed an appendicectomy for an acute attack.

In January, 1924, she showed signs of bladder trouble, suffering from frequency of micturition accompanied by severe pain; this was due to calculi, and for the condition she was operated on in Salford Royal Hospital in January and November of that year.

For two years she was free from any bladder symptoms although the gastric symptoms still persisted.

In January, 1927, her bladder symptoms returned in a more aggravated form, and it was found that she had a small sac connected with the base of the bladder. She was operated on for this in St. Peter's Hospital, London, in June, 1927; since that date she has shown no further bladder trouble.

During all these years she was never free from abdominal pain, vomiting, headaches, and a feeling of fullness in the upper abdomen. I was called to see her on the evening of June 27th, 1930, and found her in a typical attack of biliary colic. Her general condition was not good; I gave her morphia. Her gastric symptoms for the previous six months had almost become unbearable, and at the patient's and her husband's request I was urged to undertake another operation. On June 30th, 1930, I performed a cholecystectomy, removing the gall-bladder with 20 stones, and undid the gastro-enterostomy. She had an uneventful recovery. To-day she is perfectly well, and for the first time in 28 years is free from any symptoms. She looks, eats, and sleeps well.

Manchester.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE.

SECTION OF NEUROLOGY.

The opening meeting of this Section was held on Oct. 9th, when Mr. Leslie Paton, the President, delivered an address on

Classification of the Optic Atrophies.

He said that optic atrophy was essentially a degeneration of the nerve-fibres, with consequent loss of function. It showed itself clinically as an increasing pallor of the optic disc, though the appearance varied greatly with the character of the atrophy. Varied also was the loss of function, for visual acuity might be markedly reduced with good peripheral fields, or there might be good central acuity with much peripheral restriction. Colour fields were sometimes affected more than the white, and the power of light and dark adaptation might be diminished or slowed down. Variations of visual field were valuable in determining the cause of the atrophy. The disc of an old person was usually paler than that of a child, and the disc of a myope paler than that of a hypermetrope. A pathologically pale disc did not necessarily mean detectable loss of function. The extent of affection of the vessels varied in different types of atrophy. Diminution in the calibre of the arteries was a characteristic feature of retinal degenerations, while in tabes the calibre might be apparently normal. Attempts to attain great simplicity in classification of the atrophies could only be harmful. A perfect system should be completely inclusive and exclusive; it should include all cases in one or other of its subdivisions, and each case should be embraced in one subdivision and excluded from all the others—this last condition was impossible to satisfy. The classification must strive to indicate the relation of one form to another. There must be a continual readjustment of labels as the knowledge of conditions became more intimate.

OBJECTIONS TO THE TERMS "PRIMARY" AND "SECONDARY."

Nothing could be more misleading than the use of "primary" and "secondary" as commonly applied to cases of optic atrophy. Primary should be applied to an atrophy of the optic nerve in which the toxin or the trauma acted directly on the nerve-fibre and killed it; and, similarly, a secondary atrophy would be that form in which the death of the nerve-fibre was a consequence of inflammation or degeneration of other structures on which the nerve was dependent. These meanings, however, were far from those given in the text-books. True primary atrophies were probably limited in number. The books stated that a secondary or consecutive atrophy was one in which the optic disc showed evidence of an antecedent œdema or papillitis; but cases were seen in which, after the subsidence, no trace of the preceding œdema remained, or in which the disc exactly resembled that of a so-called primary atrophy—i.e., it had clear edges, undisturbed retinal pigment, and a lamina cribrosa showing in the physiological pit. He would have the terms "primary" and "secondary" entirely abolished from books dealing with optic atrophy.

A BETTER CLASSIFICATION.

Being a tract of the central nervous system the optic nerve suffered the same pathological changes as other white tracts; thus it might take part in systemic degenerations whose cause remained unknown. The effect of various causes was modified by the different anatomical relationships of the nerve in the several parts of its course. A patch of disseminated sclerosis might affect any portion of the nerve where there was a myelin sheath, and if the anterior part of the nerve was affected the result

might be œdema of the papilla. Certain toxins affected the nerve diffusely; probably the aryl-arsonates did so. The first basis of classification should be into (1) atrophies of localised origin, (2) those of diffuse or indeterminate origin, (3) those of unknown origin. Most cases belonged to the first category, so that one's concern was mainly with its subdivisions. The main bulk of cells from which the fibres of the optic nerve arose lay in the retina, so that most (not all) the fibres were ascending. Some descending fibres might possibly be concerned with dark adaptation. The optic nerve could conveniently be divided into three parts—the retinal, the papillary, and the retrobulbar—the last being further divisible into orbital, foraminal, and intracranial. Any of these portions might be the seat of the primary lesion. There could thus be three main classes of optic atrophy of localised origin: retinal, papillary, and retrobulbar. In each of the main divisions atrophy might be the after-effect of inflammation or degeneration, and these might be locally produced, as by pressure or tractions, or might be systemic degenerations of unknown origin or due to vascular insufficiency. The inflammations might be either parenchymatous or interstitial.

Retinitis pigmentosa was a familial disease not infrequently associated with a familial form of inner ear or nerve deafness; occasionally associated with it was a family history of epilepsy. A close relationship was now recognised between amaurotic family idiocy and cerebromacular degeneration.

PAPILLARY ATROPHIES.

In a group of cases the initial damage to the nerve-fibres was at the disc itself; into this category came the atrophies due to glaucoma, those following papillitis and papillœdema, and a rarer group in which a cavernous degeneration of the disc tissues occurred in high myopes. There were two main causes of the atrophy in papillœdema. In the early stages the nerve-fibres were unaffected, and there was no functional loss; but in process of time the nerve-fibres lying in the œdematous fluid began to swell and to show moniliform varicosities. In the third stage the increasing neurological proliferation in the disc replaced the degenerate fibres, and in contracting it squeezed and killed the nerve-fibres which were left intact. In glaucoma the nerve-fibres were mainly destroyed at the disc as the result of the increased intra-ocular pressure.

ATROPHY CONSEQUENT ON RETROBULBAR LESIONS.

This group embraced the largest number of cases, and was subdivisible into (*a*) orbital, (*b*) foraminal, (*c*) intracranial. Though some of the inflammations might occur in any part of the nerve, or might affect the whole chiasma, from chiasma to bulb, papillitis was only an optic neuritis in which the anterior part of the nerve after the entry of the blood-vessels was affected. An inflammation might attack the parenchyma of the nerve directly, or might invade it from the periphery through its meningeal coverings and its interstitial fibrous structure. It might be the result of any form of meningitis, acute or chronic, septic, tuberculous, or syphilitic, and the atrophy resulting might be either complete or partial. The commonest form of parenchymatous inflammation was associated with disseminated sclerosis.

The speaker next referred to the optic atrophy which occurred during ophthalmic herpes. He was unable to throw light, he said, on the pathogenesis of the optic atrophy in these cases. During the acute stage of the herpes the eye was not in a condition which allowed of proper examination of the fundus, so the cases were not usually seen until the atrophy was obvious. He did not think the inflammation could have spread from the Gasserian ganglion to the intracranial portion of the nerve. Among the other lesions acting on the orbital part of the nerve were tumours, which might be either intraneural or extraneural.

The lesions acting on the optic foramen formed an interesting group of cases giving rise to optic atrophy The cause most frequently acting here was trauma, but this need not imply a fracture passing through the optic foramen, for even when there was a basal fracture the optic foramen was sometimes not involved. It was not settled whether the optic atrophy in oxycephaly was a result of the narrowing of the optic foramen, or whether the optic atrophy and the deformity of the skull might not be coincidental results of early meningitis. But in Paget's disease the bony thickening, reducing the calibre of the optic foramen, was the cause of the atrophy.

Dealing next with lesions of the intracranial portion of the nerve, the President said that here one had to deal with a different set of factors. Disseminated sclerosis must still be regarded as an important cause, the patch often being found to affect the chiasma and both nerves. Lastly, he asked into what division tabetic atrophy should be placed, and gave his own contribution, in detail, to a much vexed question. The primary mode of attack was interstitial, but at times it was parenchymatous. Only the pathological investigation of a large series of very early tabetics, and the careful correlation of the pathological findings with the clinical history, could elucidate the facts.

UNITED SERVICES SECTION.

AT the opening meeting of this Section on Oct. 13th, the presidential address was delivered by Surgeon-Captain S. F. DUDLEY R.N., who dealt with some

Psychological Aspects of Specialism

in the Services. Ashore, he said, where a team of practitioners could be supported by a local population, specialisation worked satisfactorily, but afloat a general practitioner was still required. Medicine was becoming more a science and less an art, and treatment more rational and less empirical. The old pose of competent omnipotence was giving way to the diffident attitude of the student of nature. Between the purely curative and the purely research attitude there must be a difference of attitude and outlook. Telling the literal truth to patients was incompatible with sound therapeutics, although in the Services the doctor could be more honest than could the local practitioner. The only remedy helpful in every malady was confidence in the doctor. The standard of truth rigorously attained by men of science was a very high one; nevertheless the plasticity of the human mind was such that it was possible to some extent to blend the two attitudes in one man, just as it was possible to blend the diverse attitudes of the hen-pecked martinet on the quarter-deck and in his wife's boudoir. The essential critical attitude of the scientific worker was apt to hamper his practical work if he worked in both branches of medicine. Many first-class practitioners remained in the same credulous state as in their student days, and their patients were the better for it. The eternal scientific question-mark was absent from many minds, and

many doctors were consciously honest while they unconsciously deceived themselves.

Specialisation was the essential corollary of evolution and had both advantages and disadvantages. To-day the specialist specialised too early and took too superior an attitude to the more widely read general practitioner. Friction between the groups might hinder progress as well as promoting it by friendly rivalry. Early specialisation might even promote a sort of pride in ignorance of other branches. These little failings could be winked at ashore, but were less tolerable in the Navy. There were not enough special cases to maintain many specialists, and the Navy could therefore insist on a certain degree of general proficiency together with specialism. It was an excellent rule that a man must see service afloat before promotion. The naval specialist must be familiar at first hand with such conditions of life as existed in submarines and 16-inch gun turrets, as well as those in the *Victory* and the ark. Analytical psychology showed that specialism formed a complex which widely affected a man's conduct in many aspects of life; the general practitioner recognised this when he feared to send his case of housemaid's knee to a surgeon lest she return without her tonsils. Nor were psycho-analysts themselves quite free from this complex. A well-known psycho-analyst had explained sea-sickness as a repression of an infantile recollection of the rise and fall of the mother's breast. Surgeon-Captain Dudley candidly did not feel that this hypothesis was based on so firm a foundation that bottle-fed recruits should be accepted in preference to their breast-fed fellows.

THE "AMATEUR" RESEARCH WORKER.

Poor remuneration was a great hardship to the laboratory worker, but he had the consolation of knowing that he spent his life doing the work he liked best. The Services offered one of the finest fields for the research worker; he should look on his research as a hobby and not expect reward for it, and he must put his service duties first. On the whole, the rewards of research in the Services were greater than those outside. In a modern ship of war a man with a little resource and application could carry out valuable laboratory investigations at sea. There were, moreover, vast fields of research in such subjects as the food, clothing, hygiene, and psychology of the men, and in administration. He could publish or not as he liked, but his own journals were always eager for copy. Research was a more absorbing hobby at sea than cross-word puzzles or poker. If something useful emerged from the pastime, so much the better, but that was not the main object for the amateur research worker. Nevertheless many question sought answers—e.g., What was the real incidence of toe-rot? What was the best way of airing bedding during a spell of continuous bad weather? Why were sailors so attached to patent medicines, and did this habit do them any harm? What were the psychological factors underlying a "happy" and an "unhappy" ship? What was the best way for an ordinary medical officer to deal with a surgical emergency on the high seas without expert help?

AUTHORITY IN MEDICINE.

Experimental work on animals had proved of the greatest value to clinical medicine; the observational method had received a new impetus. In discussing a subject it was useless to say that Prof. Highbrow had given such an opinion without saying why he said it, or giving the reference to his original paper, so that the reader could look up the argument for himself. If the "amateur" research worker published his work he must do so in proper form. Hero-worship was a great element in social life, but just for this reason it must be carefully watched in scientific work. The average modern worker approached his subject with greater caution than did the ancients just because he realised his ignorance to a far greater extent than his forefathers had. Much valuable work had been done in the editing of old text-books and finding out how many of their statements were really correct. As Sherlock Holmes had said, "It is a capital offence to theorise before one has data."

NEW REMEDIES AND AMBIGUOUS WORDS.

An important part of research work and one peculiarly liable to the post hoc fallacy was the testing of modern therapeutic agents. Trotter regarded this fallacy as a kind of conditioned reflex; any cause was better than none, and if the real cause were inacceptable or not evident any striking event was supplied to relieve the acute mental agony of not knowing why. There was only one reliable method of testing any new treatment and that was to treat alternate admissions without any selection whatever until a sufficient series had been collected and the data carefully examined. The smaller the differences the greater the number of cases required to establish them. A scientific attitude of masterly inactivity was hard to maintain in face of the patient's and relative's sufferings, and more patients were over-treated than under-treated.

Words and phrases could often be different and mean the same thing, and vice versa. There must be no ambiguity of meaning if medicine was to advance. The Services could insist on more honest diagnosis than other branches of practice, and might surely allow "I do not know." The category of "P.U.O." had much to recommend it; it was honest and did not confuse the work of the statistician. The doctor could at least be honest on official sick returns, if not to his patients. Words like "typhoid" and "virulence" often meant different things to different writers; when words of this kind had to be used they should be carefully defined. It was extremely difficult to convey the exact shade of meaning that an author wanted to attach to the phrases he used. Original papers—not abstracts—must be studied, for they usually conveyed a slightly different meaning.

The seeker after truth should always put to himself a short catechism when he was confronted with any statement to which he was not personally indifferent—"Do I believe or disbelieve this thing, either because I want to, or because it is the custom of my herd and my heroes to do so, or because of an uncontrolled post hoc argument, or because I have misunderstood the author?" In this way he could greatly, though never completely, reduce the subconscious bias that swayed all our thoughts and actions. These remarks concerned only science; how far it was possible to carry their principle into daily life the speaker did not pretend to know. As regards everyday life he would take the advice of King Solomon: "Be not righteous overmuch, neither make thyself overwise; why shouldst thou destroy thyself?"

A HOSPITAL FOR DOWNHAM, KENT.—It is proposed to build a hospital of 50 beds at a cost of £28,000 in this thickly populated district of working-class homes. The population of Downham is 36,000, of whom 20,000 are children, and the neighbouring hospitals are constantly overcrowded.

RADIUM COMMISSION.

FIRST ANNUAL REPORT.[1]

THE period covered by the first annual report of the Radium Commission, dated August 31st, 1930, is nearly a year, since the Commission started work on Sept. 26th, 1929. It is recorded that the first decisions of the Commission were to accept the offer of the loan of a four-gramme "bomb" for a period of three months, free of charge; and to entrust this "bomb," provisionally, to the Westminster Hospital to carry out a special programme of radium therapy suggested by the Commission. Moreover, the first 5 grammes of radium were ordered and placed in containers in anticipation of the requirements of national centres. The Commission then addressed itself to the task of framing and creating a national organisation, with the primary objectives of (*a*) "treatment of the sick" as prescribed by the Royal Charter, and (*b*) the evaluation of radium in the treatment of cancer as determined by results over a period of years. To this end it was decided to concentrate the available radium at 12 national centres outside London, and in London to combine a centre for treatment with a post-graduate school of radiotherapy for the service of the whole country. The selected centres were required to furnish detailed replies to two questionaires prepared by the Commission—No. I. dealing with the staffing, organisation, equipment, and experience in radium therapy of the hospital nominated; and No. II. with the methods of technique in radium therapy proposed to be followed. The centres were also asked to formulate and submit a schedule of their requirements, and were urged to avoid abnormal demands, to adopt proved methods of technique, and where possible to bring patients to fully equipped clinics rather than to take radium to the patients.

Rental charges are made for radium loaned to centres in order to avoid drawing upon the capital of the National Radium Fund to defray administrative or overhead expenses, and to preserve undiminished the sum of money available for the purchase of radium. The Commission expresses the belief that this policy will commend itself to Parliament and the public, even though it may not always be welcomed by the financial authorities of the centres concerned. The rate of rental at present fixed—i.e., 2 per cent. per annum of the capital value of the radium and containers—is provisional and is subject to revision. It is not, of course, desired to make any financial profit from the loan of national radium.

Radium Supply.—A total of 18½ grammes has been ordered by the Radium Trust. Of this amount some 18 grammes have been provisionally allocated to national centres, and it is hoped that the whole of this amount will be in full clinical use by the end of 1930. At the end of August 14 grammes had been received from the manufacturers and 8 grammes had been actually delivered to centres.

Outside Demands for Radium.—The Commission has received many applications for grants of radium from institutions throughout the country. Even if an unlimited stock of radium had been available, the Commission hold that, in the present state of knowledge of radiotherapy, an indiscriminate or even a wider distribution of national radium would be undesirable. The dangers, both to operator and patient, attendant on the use of this new and potent weapon are not only real and serious but there is much popular misconception (extending sometimes even to the medical profession) with regard to the efficacy of radium and the technical difficulties of its clinical use.

Inability to meet demands for radium does not, however, signify any lack of sympathy on the part of the Commission with non-selected hospitals which are adequately equipped and staffed to undertake, and which are anxious to practise, radiotherapy. They have been urged to comply with the rules and precautions for the use of radium adopted by national centres, and to make use of the national forms of clinical case records (of which specimens are given in this report) in order that statistics may be based upon as wide an experience as possible.

A NATIONAL POST-GRADUATE SCHOOL.

Since the need of practitioners fully qualified to practise radiotherapy is urgent, the Commission drew up a scheme for the creation of a post-graduate school of radiotherapy. They suggested the coöperation of the Mount Vernon Hospital at Northwood, Middlesex, which had recently decided to devote its energies to the study and treatment of cancer, with the Radium Institute in Portland-place, London, in the establishment of such a school, and eventually a joint scheme was worked out. Under a scheme prepared by the Director of Medical Services of the Hospital and Institute (Sir Cuthbert Wallace), the main clinical and pathological work of the joint institution will be carried out at Mount Vernon, whilst the diagnostic and out-patient department, with a proportion of the surface therapy work, will be centred at the Radium Institute, which will also become the Commission's principal centre for the supply of radon (radium emanation). Three grammes of national radium is being allocated to Mount Vernon Hospital for clinical work, and 1 gramme to the Radium Institute for radon. The post-graduate school is being inaugurated this autumn (October, 1930).

The Commission note that satisfactory coöperation has been established with other bodies, notably the Medical Research Council, King Edward's Hospital Fund for London, the British Empire Cancer Campaign, the Cancer Commission of the League of Nations, and the National Physical Laboratory.

TECHNIQUE OF RADIUM THERAPY.

Although much experimental work is being conducted in many countries, it cannot be claimed that the methods of technique have yet become standardised or are incapable of improvement. It is therefore the policy of the Commission to encourage and try out all approved methods, as well as those which, in the judgment of its advisers, afford good promise of success. At present there are four main techniques:—

(1) The use of *radium in containers* (i.e., needles, tubes, &c.) which are inserted surgically into the diseased tissues or placed in natural cavities of the body.

(2) *Surface therapy*, the radium containers being placed in external contact with the body or very close to it.

(3) *Distance radium therapy* (or mass irradiation) by means of a "bomb" containing a large quantity of radium, which is placed at a distance of some inches from the body.

(4) *Radon therapy.* Similar to No. (1) except that, instead of radium being used, "radon" (i.e., the gas emanating from it) is collected and sealed in small tubes or "seeds" which are inserted in the tissues.

The Commission has arranged that all national centres shall be equipped to practise methods (1) and (2); that some of them (five at present) shall in addition be equipped for the production of radon, and *one* hospital (Westminster) shall be specially charged to try out No. (3). This position is subject to modification as and when further experience indicates the desirability of introducing new methods

[1] H.M. Stationery Office, 1930, Cmd. 3678. 1*s*. 3*d*.

or possibly discarding others which are already in use.

The *Westminster* "*Bomb.*"—The four-gramme "bomb," originally on loan, was purchased. This "bomb" was acquired in order to enable the Commission to try out the method of "distance radium therapy," or "mass irradiation," which has been practised for some time past in other countries (with undetermined results), and which, if proved successful, might, in many cases, obviate the need for surgical interference. It is too soon to formulate or publish any considered conclusions. As at present advised, however, the Commission is of opinion that the experience so far gained is not sufficiently encouraging to justify the acquisition of any more large "bombs" at the present time.

Appendices.

The report contains, as appendices: (1) a balance sheet; (2) a specimen of agreement with national radium centres; (3) a summary of the present stage of development of the 12 national radium centres; (4) a reprint of memorandum published by the Commission in November, 1929, deprecating extravagant claims for the healing properties of radium, and setting out a considered view of the true position; (5) specimen "national radium forms" for case-records of malignant disease affecting various regions of the body, with reproductions of the charts devised by Prof. Regaud; (6) a memorandum on the policy to be adopted by the Commission towards hospitals or medical groups (other than the national radium centres) who may apply for advice, guidance, or loan of radium; (7) a memorandum furnished to the National Radium Commission on the relation between the Mount Vernon Hospital and the Radium Institute; (8) a note on the care and custody of radium; (9) a memorandum on radon departments at national centres.

Conclusion.

The Commission again emphasise that great caution is necessary in estimating the value and efficacy of radium in the treatment of malignant disease and they strongly deprecate the creation of false hopes by means of sensational, or even optimistic, statements. As a result of world experience, extending now over many years, the best that can be said is that some results, under certain conditions, are very satisfactory; that others, for no clearly established reasons, are less so, and that in a considerable proportion of cases the results are either inconclusive or definitely disappointing. They hold that this does not justify a pessimistic outlook, as many problems which yet remain unsolved may yield to experience and research. But time is an essential condition of success and it can only be after several years of pioneer work that there can be a sufficient supply of statistical and scientific data to enable positive conclusions to be reached and published to the world. The Commission have therefore made it their first duty to organise a concentrated and controlled national radium service, with a definite and coördinated programme which will be carried out at selected centres under the supervision of recognised experts, and of which the progress and results will be recorded on a uniform system. By this means the treatment of the sick, which is enjoined in the Royal Charter, will proceed pari passu with the advancement of knowledge of the best methods of radium therapy, whilst due economy will be secured in the utilisation of the limited stock of national radium.

Finally, the Commission repeat their warning that radium is not yet established as a "cure" for cancer; that whilst it holds out a good promise of beneficial results, and certainly of alleviation of suffering, it is at present a very dangerous weapon and one which unless used with the greatest skill, care, and precaution may easily be productive of more harm than good. This is the Commission's considered opinion, as the result of its first year's work, but it is noted that at least five years of further experience and coördinated research will probably be required before any final verdict can be anticipated.

REVIEWS AND NOTICES OF BOOKS

Cancer of the Larynx.

By Sir StClair Thomson, M.D., F.R.C.S., F.R.C.P., Emeritus Professor of Laryngology in King's College Hospital; and Lionel Colledge, M.B., F.R.C.S., Surgeon to the Throat Department, St. George's Hospital. London: Kegan Paul, Trench, Trübner and Co.; Anglo-French Library of Medical and Biological Science. 1930. Pp. 244. 25*s*.

The treatment of cancers of the throat has made considerable progress during the last decade and this careful and up-to-date exposition by two of the surgeons who have taken a leading part in this advance is opportune. The greater part of the book is occupied by the discussion of operative treatment, but a later chapter deals with treatment by radium and X rays. This chapter is largely a record of disappointments, but some of the unfavourable opinions quoted date from the earlier part of the decade; somewhat better results, which are also quoted, have been obtained during the last two or three years, and it should be remembered that the early results of surgical treatment were also very discouraging. The authors do well to point out that radiation cannot be advised indiscriminately for inoperable cases on the ground that it may do good and will do no harm, for it is quite as likely to aggravate the symptoms as to give relief in the cases under discussion.

The earlier chapters are concerned with pathology, symptoms, and diagnosis; Sir StClair Thomson's long experience gives great value to this part of the book. In the diagnosis of post-cricoid cancer the difficulty of inspecting this region is noted, together with the risk of damage by an œsophagoscope; the value of palpation through the mouth is mentioned, but not von Eicken's method of inspection, aided by pulling forward the larynx with a probe in the anterior commissure; this procedure is easy, causes no damage or discomfort, and often affords a good view of the hypopharynx. The authors' advice that there is no need to be in haste to settle a diagnosis, if there is insufficient evidence, is only safe if it is confined, as they intend, to genuinely early cases where neither extremity of the cord nor the subglottic region is invaded; otherwise any long delay may well end in disaster.

A clear and complete discussion of the operations of laryngofissure and laryngectomy occupy about

one-half of the book. In the former operation the authors advise excision of the greater part of the ala of the thyroid cartilage, freed from the perichondrium on both faces, before the actual removal of the growth; they claim that this step does not produce stenosis, that it affords better access, and that healing takes place more rapidly than over a surface of denuded cartilage. In laryngectomy they prefer the method of Gluck, removing the organ from above downwards, and give good reasons for their preference; they take out the feeding-tube after 12 or 24 hours and introduce it afresh for each feed. The lateral pharyngotomy operation, as developed by Wilfred Trotter for the extirpation of growths situated on the upper aperture of the larynx and in the post-cricoid region, is described, as also is his median translingual operation which gives access to the epiglottis and base of the tongue; subhyoid pharyngotomy offers a less free approach and is only advisable for strictly limited epiglottic tumours. The modern operation by laryngofissure approximates in extent to hemi-laryngectomy, and other methods of partial and hemi-laryngectomy, such as that recently devised by Hautant and Ombrédanne,[1] are therefore not described. It is clear that the recent improvement in the results of the surgical treatment of malignant disease of the larynx is to a great extent due to the limitation of the operation to suitable cases. Most surgeons now limit laryngectomy to intrinsic cases, and the indications for laryngofissure are strictly defined. The authors' remarks on the indications for various types of operation are, therefore, of particular interest; all will agree that a surgeon should not allow himself to be forced into operating on unsuitable cases on the plea that the disease is invariably fatal.

The book is an important addition to the literature of this specialty, and should be in the hands of all laryngologists.

Visceroptosis

and allied Abdominal Conditions associated with Chronic Invalidism.

By H. BEDINGFIELD, D.S.O., M.D., Ch.B., M.R.C.P. London: Humphrey Milford, Oxford University Press. 1930. Pp. 176. 10*s.* 6*d.*

Dr. Bedingfield has earned our thanks by collecting and analysing modern work on visceroptosis. In addition to reviewing the extensive literature and critically examining the various theories propounded, the author has drawn on his own wide clinical experience. The book opens with a description of the clinical picture, drawn from various writers. Though Burton had described "flatuous melancholy" in 1621, and though anatomists had long recognised variations in shape and position of the abdominal viscera, a dislocated kidney being noted by Pedemontanus as early as 1589, it remained for Glénard, in 1885, to suggest that prolapse of the abdominal viscera was intimately connected with symptoms, both local and general. This writer has exercised so great an influence on our conception of enteroptosis, as he termed it, that Bedingfield has divided his historical review into three eras, pre-Glénard, Glénard 1885–1899, and post-Glénard. Glénard's views, particularly his change of front from a cause purely mechanical to one due to deranged hepatic function, are concisely set out as are those of other writers on ætiology. In the present century investigation has followed three main lines: radiological, anthropological, and surgical. The results thus obtained are discussed fully, so that many untenable positions are revealed in the purely mechanistic theories.

After reviewing briefly our present knowledge of the motor functions of the gastro-intestinal tract, the author considers the various physiological theories that have been put forward as the cause of the symptoms which may follow visceroptosis. The confusion that followed Bouchard's introduction in 1887 of the term auto-intoxication is well described, and Mr. Bedingfield concludes that "the persistence of the idea that poisonous substances were formed in the intestine and absorbed into the body from there, despite repeated failure to demonstrate their existence, suggests an emotional rather than a scientific state of mind." He then examines the relationship between physical symptoms, mental reaction, and constitutional make-up, and analyses his own series of cases from this point of view. Two types of mental reaction are described, the fictitiously cheerful and the querulously introspective, and the mental make-up is regarded by Bedingfield as of the greatest diagnostic importance; in this connexion he stresses the great importance of a careful clinical history. Surgical intervention he regards as disastrous; "as a method of treatment it is useless; as a method of diagnosis it is criminal." These are strong words many will support. Treatment is essentially preventive, but sensible therapeutic measures are laid down for use when the condition is once established.

This monograph is sane, well reasoned, and moderately expressed, and makes a genuine contribution to our knowledge on a difficult and ever-present problem. As Dr. Robert Hutchison says in his foreword, it is "of real value both to the student of pathology and to the practitioner."

[1] THE LANCET, 1930, i., 1238.

A Compilation of Culture Media.

By MAX LEVINE, Ph.D., Professor of Sanitary and Technical Bacteriology; Bacteriologist, Iowa Engineering Experiment Station; and H. W SCHOENLEIN, M.S., formerly Fellow in the Department of Bacteriology, Iowa State College. Prepared at the request of the Society of American Bacteriologists and financed by a grant from the Digestive Ferments Company, Detroit, Michigan. London: Baillière, Tindall and Cox. 1930. Pp. 969. 67*s.* 6*d.*

THIS book is of a type likely to become common in the future with the evolution of the ancillaries of medicine. It has nearly a thousand pages devoted solely and soullessly to concentrated abstracts of recipes for culture media. It has been produced, we gather, at the request of the Society of American Bacteriologists and prepared in the Department of Bacteriology of the Iowa State College. Invaluable as such a mountainous compilation must be, as a work of ready reference, it impresses us even more as a commentary upon the unwieldly growth of scientific publications and the associated reverence for literature. To look at such a book is to realise, on the one hand, the difficulty, which will soon amount to impossibility, of consulting original sources, and the need for the abstractor and the compiler as cogs in the complex machinery from which comes an increasing and unceasing supply of scientific papers. On the other hand, a book of this type shows also the relative inutility of this mass of publication and the hampering effect it imposes on the diffusion of real knowledge. Are 2543 varieties of culture media necessary for the adequate investigation of the known bacterial species? Whilst Prof. Levine and Mr. Schoenlein have no doubt done some service by collecting and recording

the composition of all of these, would not their work have been doubly or trebly as useful, to say nothing of being infinitely more interesting and instructive to themselves, if they had critically examined only a proportion of these media, told us of their relative usefulness, and indicated which formula served best for a stated purpose? However, the request of the Society of American Bacteriologists, we may well believe, overrode any personal inclinations they may have had. The Digestive Ferments Company of Detroit, Michigan, played their part on the financial side, and together the team has produced a handsome and costly volume in the best style of the publishers.

The contents of the book have been indicated: besides the usual indices it also contains a Constituents Index which records the pages upon which certain substances are mentioned; thus we find that glucose is mentioned in some 450 and sodium chloride in some 550 different places. All this seems a waste of time and energy, but some bacteriologists, ignoring such superfluous matter, may find it convenient to have such a comprehensive list of media collected in one volume.

Les thérapeutiques nouvelles.

By GASTON LYON. Paris: Masson et Cie. Pp. 389. Fr.26.

THIS little volume is an attempt to review contemporary therapeutics and to lighten the task of those who wish to keep abreast of the changes and innovations that are taking place in medical treatment. The book is made up of 27 chapters and covers a wide field; the subjects are treated in a way that emphasises what is new and what is a new application of an old treatment. The subject matter is largely composed of summaries and in parts develops into mere lists of applications; but a critical attitude can be detected in some sections and is most welcome. In the chapter on chemical medicaments many drugs will be found which are little known to English readers, but a short account is given of such newer drugs as acetylcholine, ephedrine, ergotamine, quinidine, and phenylhydrazine. The chapters on physical agents make interesting reading, and may cause some surprise to English readers. Not all will agree that X rays are the treatment of choice for exophthalmic goitre, or that ultra-violet light is of real value in disseminated sclerosis, for which disease diathermy and X rays are also suggested. Other chapters include those upon psychotherapy, serum treatment, symptomatic and specific treatments, as well as sections upon individual systems.

For those who wish to obtain a general outlook upon present-day therapeutics from an unfamiliar angle this little book will make interesting reading.

Foundations of Mental Health.

By LEONARDO BIANCHI, late Professor of Nervous and Mental Diseases in the Royal University of Naples. London: D. Appleton and Co. 1930. Pp. 277. 10*s.* 6*d.*

THIS work is not a scientific text-book, but a series of essays by a psychiatrist of great attainments and long experience on the various social problems common to all countries. He deals at considerable length with mental hygiene; this chapter occupies more than a quarter of the book and is concerned chiefly with education. The chapter on alcoholism is exhaustive and impartial; it is well worth reading if only as a guide to the literature on the subject. His conclusion that alcohol, except in very small quantities, is a racial and individual poison is in line with that which most authorities seem to reach nowadays, but he is no advocate of legal prohibition. On sexual problems Prof. Bianchi is less helpful. The work is well translated, but is rather encumbered by generalities. Much of the author's idealism is bewildering, and the general impression left by the book is that the foundations of mental health are hardly on ground level. But Prof. Bianchi's vigorous insistence on the necessity for recognising and drastically dealing with parasitism of all sorts, from alcoholism to optimistic idleness, will be acceptable to many of his readers, and though all may not agree with his views none should be bored by their recital.

Recent Advances in Diseases of Children.

Second edition. By W. J. PEARSON, D.M., F.R.C.P., and W. G. WYLLIE, M.D., M.R.C.P. London: J. and A. Churchill. 1930. Pp. 548. 15*s.*

THE interest which this volume aroused when it appeared in 1928 will be maintained by the second edition. Numerous alterations and additions have been made; as a result of much condensation, especially of the more theoretical parts, the authors have been able to introduce a number of new sections which add to the completeness of the book, while its size is actually diminished. The theory which they propounded in the original edition was that children tend to deviate from the normal along two definite lines, resulting in the lymphatic, alkaline, hypocalcic type, and the acid, hypercalcic type. This theory is restated, but with some modifications in its applications to particular diseases. Cœliac disease and scurvy, for instance, are no longer included among the extensions of the lymphatic type, and throughout the book less emphasis is laid on the therapeutic effects of fruit and vegetable juices. Among the additions are short accounts of encephalomyelitis and of the treatment of chorea by nirvanol. The section on the pathogenesis of cerebral diplegia has been revised, and more recognition is given to intracerebral birth-hæmorrhage as a precursor of spastic paralyses. The chapter on respiratory disease contains numerous alterations, and the work of A. Ghon is included in the section on pulmonary tuberculosis; a new classification of asthma—into primary and bronchial types—is adopted.

The authors have used much skill in the preparation of the new edition, which will enhance the reputation of this work as an interesting combination of speculation and clinical observation.

Les artérites et les gangrènes par artérites.

By GEORGES SPEHL and EDGARD TYTGAT. Brussels: R. Fischlin. 1930. Pp. 43.

THIS is a summary of views on the pathology and treatment of gangrene due to arterial disease rather than an original contribution. Indeed, the authors do not support their statements by the citation of clinical cases and appear to have accepted the teaching of Leriche in his earlier period without reserve. They believe that peri-arterial sympathectomy will improve the circulation of the limb so much, when gangrene has already occurred, that lower amputations become possible. This is very difficult to prove or dispute from the experience of a single surgeon. They testify to the great value of Moschowitz's test in the selection of the amputation site.

THE LANCET.

LONDON: SATURDAY, OCTOBER 18, 1930.

LOCAL GOVERNMENT OFFICERS AND SECURITY OF TENURE.

In the House of Commons last session the Scottish Office representative answered a question as to the municipal and other local government officers in Scotland who enjoy security of tenure. The details of the reply indicated that medical officers of health and sanitary inspectors are by no means the only officials thus protected in Scotland. In England, where the confidence of many local authorities' servants must have been rudely shaken last year by the decision in Brown *v.* Dagenham Urban District Council, there has been a tendency to regard the medical officer of health as an exceptionally privileged person possessing an almost unique freedom from the risks of summary dismissal. His security of tenure, however, is, in England, neither absolute nor universal. Excellent so far as it goes, the Public Health (Officers) Act of 1921 does not apply to every medical officer of health, much less to every assistant officer. The position of part-time medical officers depends rather upon departmental than on Parliamentary enactment; Article 10 of the Sanitary Officers Order is somehow not so solidly reassuring as a section in a statute. Uncertainty of tenure will be inevitable in the reorganisation of services and the evolution of schemes consequent upon last year's Local Government Act. Above all, a contract with a local authority has proved a broken reed. Brown's case revealed the surprising fact that a local government officer, notwithstanding that he held a contract of service with his local authority, under which there was provision for three months' notice on either side, could be dismissed at pleasure by virtue of Section 189 of the Public Health Act of 1875. Naturally, this decision received attention in the Final Report of the Royal Commission on Local Government issued last year. The Commission recommended that all such contracts should be made valid and enforceable. A few months ago the Earl of Onslow pressed the Government to say when this and other recommendations in the Report were likely to receive legislative effect. He received a rather cautious reply from Lord Parmoor, and a similar question in the House of Commons elicited but little further encouragement.

There are two considerations here to which the Royal Commission gave expression. On the one hand, local government officers ought not to be harassed by insecurity, particularly where agreements exist which Brown's case has shown to be nugatory. On the other hand, there is no desire to encroach upon local autonomy or to increase the concentration of power in the central government. Where an officer is protected by the fact that he cannot be dismissed without the order or consent of the Ministry of Health, it must be recognised that his position is difficult if the local authority threatens him with dismissal and he is retained by direction of the central department. The Royal Commission refused on this account to recommend any extension of the right of appeal to the central department before dismissal. Lord Parmoor distinguished the cases (such as certain medical officers of health and sanitary officers) where part of the official's remuneration comes from central funds; in these cases he thought it right that there should be a right of appeal to the central authority. But neither Lord Parmoor nor the Royal Commission appear to have given as much weight as could have been wished to a third consideration—namely, that it is obviously undesirable that an officer should be deterred from carrying out his duties as the law prescribes through fear of incurring the displeasure of his council. This is a point of public, and not merely professional, importance. Its significance was apparent in the early stages of the struggle to obtain security of tenure for medical officers of health in Scotland when pioneers like the late Dr. Wallace, of Greenock, encountered almost single-handed the opposition of interests connected with building and property-owning. The fearless exposure of scandalous conditions a generation and more ago, and the strict enforcement of the minimum standards of public health laid down by Parliament, would hardly have been possible without protection from dismissal. Section 15 of the Public Health (Scotland) Act of 1897 seems to give a more solid and universal security to medical officers of health than the corresponding English enactments provide. Why should these officers be at less advantage in England?

THE STETHOSCOPE.

In choosing for the theme of his presidential address to the Medical Society of London the stethoscope, its origin, development, and values, Dr. R. A. Young went further than making a historical survey, for he pointed out, with appropriate divagations into philosophy, that all progress in human knowledge involves a readjustment of accepted views, so that always, at any present epoch, the problems exist of what to retain and what to discard, and how to correlate the old with the new. We publish the substance of the address, and readers will be in accord with its two fundamental messages; first, that to Auenbrugger and Laennec medicine owes the establishment of methods of physical examination of the sick which have lasted with but little modification since their possibilities were discovered, and which throughout that long period have proved of immense practical value; and, secondly, that the use of the stethoscope has not been rendered nugatory by recent work in the laboratory or

the X ray department. "Il attends pour regarder les monnaies, qu'elles sont devenues des médailles" was a witty Frenchman's criticism of an antiquarian; but it is in no antiquarian spirit that Dr. YOUNG speaks, for he regards the stethoscope as a current coin and not a medal.

The determination by the sense of hearing of the condition of certain internal organs was, as Dr. YOUNG pointed out, attempted, and attempted with some success by the earliest physicians; but we must remember that the information gleaned by them through auscultation was vitiated by ignorance, while their ideas of systematic anatomy were incorrect; for the uses of the organs of the body were hidden from them so that the detection of any alterations produced by disease conveyed little trustworthy teaching either as to cause or remedy. LAENNEC'S invention of the stethoscope, an event which is recorded by Dr. YOUNG with the interesting detail that it merits, immediately made much of the elaborate theorising and procedure of clinicians, not so much unnecessary as accessory. The powers of observation displayed by the historic leaders of medicine, from (say) HIPPOCRATES to HEBERDEN, have been a source of wonder to all who have studied their works in the original or who have followed the developments of their teachings as they are recorded in literature, and Dr. YOUNG'S address leads us not only to retain this feeling of admiration for historic wisdom, but to recognise that there is room to-day for similar intense investigation and acute reasoning, although clinical medicine has received through the stethoscope, and is now receiving through the application of X rays, such large and varied assistance. It is not respect for the training which the last four generations of doctors has received that renders the story of the stethoscope a sort of holy writ; it is as a symbol of progress that we should regard LAENNEC'S invention, for its present employment has multifarious uses, and these should not be overlooked because certain deductions founded upon stethoscopy have proved erroneous, while in important directions sounder information is now obtained by the use of X rays.

Some 60 years before LAENNEC published the Traité de l'Auscultation Médiate, which embodies the present methods of auscultatory examination, AUENBRUGGER had indicated, by describing the art of percussion in reference to diseases of the chest, the vast field of knowledge that lay literally under the hand of the doctor but which remained undiscovered. The knowledge of pathological processes conveyed by percussion was necessarily limited, but recognition through the ear of the relation between the sensations produced in the doctor by percussion and the presence of disease in the patient was already a part of medical equipment when the stethoscope was invented. On the conditions which can now be detected and separated from each other by the stethoscope there is no need to dilate, and to do so was no part of Dr. YOUNG'S intention. His text was larger than this, being a plea for the observance of continuity in clinical procedure, whereby the benefits of early investigation should not be lost to the world in the development of later medicine.

HEALTH AND ACTIVITY.

THE work carried out by the Industrial Health Research Board is designed to be utilitarian. The Board is not content to add to the sum of human knowledge in the abstract, but is anxious actually to oil the wheels of the world's progress, and therefore directs its efforts to revealing the influences governing healthy activity. Early in its career the Board showed that the working environment which makes for greatest productivity makes also for least sickness. Later, an intimate connexion was found to exist between the tendency to sustain accidents and to endure ill-health. Then came the demonstration that the best and most skilled workers are those who lose least time for sickness and have fewest accidents. Steadily a picture is being painted which portrays health and contentment as a corollary of physical and mental activity expended in economic and skilled productivity. If this picture seems to flatter the actual facts, and to represent a flourishing industrial concern in too glowing a light from the point of view of public health, it must be remembered that the studies which demonstrated this connexion between efficiency, freedom from accidents, contentment, and good health in workers were undertaken and pursued without prejudice and that the results were, especially as regards accidents, largely unexpected.

The tenth annual report of the Board, just issued,[1] is a short one, but records further advances, and tells of useful investigations still proceeding. The Board has been fortunate in obtaining the services of Sir DAVID MUNRO, till lately medical director of the Royal Air Force, to succeed its retiring secretary, Mr. D. R. WILSON. Mr. WILSON has been secretary to the Board since its inception and by his initiative, originality, and organising ability, has largely contributed to its success. Conclusions have been reached, indicating how improved illumination improves feeling-tone and output in the case of tile-pressing by 12 per cent. The effect of natural ultra-violet radiation on indoor workers is under observation. It has been proved that for work demanding discrimination of detail fine spectacles are of practical value to workers, whether of normal or abnormal vision. Heating and ventilation have been studied in schools with regard to sickness: the conditions advantageous for unheated open-air schools were noted, and the value was estimated of different systems for heating rooms, particularly by panels in the ceilings or walls. In these directions, and in many others advantageous but empirical, several current practices have been placed upon scientific and statistical bases.

The utility of the Board's results would, however, be greatly increased by more widespread acceptance. It is not enough for a firm here and there to adopt half-heartedly rest pauses at some repetition process; or for another to use motion study to lessen fatigue; or for a third to reduce accident frequency by expert selection when engaging labour. The

[1] Tenth Annual Report of the Industrial Health Research Board to Dec. 31st, 1929. London: H.M. Stationery Office. 1930. 6d.

established truths relating to the working of the human machine should be practised wherever that machine is employed, if only in order to lower the cost of production by enabling that machine to function most economically. We in this country are establishing these truths, but we are leaving others to adopt them. Some scheme is required for making them known by educating managers and heads of departments. The coöperation of industries in the fullest practical application of the results of research work should be secured. Further, the close association shown to exist between well-regulated activity and health emphasises the baneful influence being exerted on the nation by the present state of unemployment. It is an influence which no monetary dole can inhibit; it can only be met by active occupation, and preferably by wage-earning occupation. Here, again, is found manifested the truth that what is beneficial to the physiological functions of the individual is beneficial to the body politic.

ANNOTATIONS

MEDICAL SERVICE FOR SECONDARY SCHOOLS.

THERE are people who do not realise the need for extending medical inspection and treatment to the secondary schools of this country. They assert that the parents are both able and willing to provide what supervision and care are required, and that neither the expense nor the interference of an official service is justified. Certainly if it were the universal practice for parents to have their children overhauled at intervals by their own doctor—in many ways a highly desirable procedure—there would be some force in the argument, but such arrangements are unusual and few practitioners devote attention to such things as early defects of teeth or errors of refraction. An increasing number of children now go on from elementary to secondary schools, and they at least would suffer from losing the care and oversight they had had before. The type of supervision would take on a new aspect, for cases of uncleanliness are uncommon in secondary schools, and an unclean child would not be allowed to take a scholarship; but they do occur, and it is particularly unfair that parents of the better type should run the risk of having their children infected with pediculi or scabies. Malnutrition due to poverty is infrequent in the higher schools, since the scholars receive a maintenance grant when it is needed, but there are the new factors of long journeys and homework which may need care. Defective eyesight is of special importance, and questions of overstrain and fatigue become significant and demand the attention which is more easily given by doctors who have an exact knowledge of school conditions. In secondary schools there is special scope for the study of dietary and for the care of minor deformities like flat-foot and scoliosis, in which the school doctor coöperates with drill instructor or games mistress. There is an opportunity for the investigation of the special problems of adolescence, on which doctor and teachers in unison can exercise a controlling influence. Dental defects are too frequently found among secondary scholars; not many parents yet realise the need for periodical inspection and the importance of prophylactic treatment of the teeth; and the private dentist who insisted over much on these might lose his job. When treatment is needed a far greater proportion of secondary than elementary scholars are referred to the family doctor, although certain cases may fall outside his usual range of practice. Defects of vision, as a rule, have to go to a centre, which should be staffed by the practitioners in the district who are specially interested in eye work. Dental cases are dealt with similarly or by a dentist appointed by the education authority to carry out both inspection and treatment; figures prove that much early caries is found only by examination with probe and mirror in the hands of an expert. In neither of these types of defect is an official scheme robbing private practice; for such children would not go to private practitioners, but would overcrowd the voluntary hospitals or fall into the hands of those who are not on the professional registers. Whatever may be thought of the ability of well-trained opticians to deal with simple refractive errors in adults, there can be no doubt that the prescribing of lenses for children, whose ciliary muscles are highly contractile, without retinoscopy under a mydriatic, is liable to cause serious errors. Most education authorities now insist that certificates should not be accepted for elementary scholars unless they come from registered practitioners; the provision of treatment for visual and dental defects in secondary schools would protect the children at a later stage of development.

A CRITICISM OF CURRENT THERAPEUTICS.

IN a clinical lecture delivered at Guy's Hospital Dr. L. J. Witts[1] amusingly tilts at modern therapeutic measures. He criticises the over-use of certain drugs, the under-use of others, and the inappropriate use of still more. Objecting first to the exhibition of remedies of doubtful composition where simpler and cheaper preparations are just as good, he points out truly that the more drugs one uses the less one learns of their actions. Till more is known about the physiology of nutrition, he says, quacks will thrive and food faddists abound, and he goes on to claim that "the scourge of the unqualified practice in this country is almost entirely the result of our own vices." To a certain extent this is undisputed; all the same, if physiology is gradually leading us nearer to the truth, it has to be remembered that many discarded methods of treatment were based on the physiology of former days, and it would be interesting to know whether modern methods mentioned by Dr. Witts—such as the use of glucose in debility and infections, of alkalosis and acidosis in œdema, of saline solutions in dehydration, of carbon dioxide in asphyxia and pneumonia—will be part of practical medicine ten years hence.

A timely word of warning is given about the use of morphia and opium, and especially the method of administration in the early stages of illness. For the sake both of the patient and the doctor, Dr. Witts says, the hypodermic needle should be avoided. It is true that owing to the difficulties now thrown in the way of acquiring morphia the fear of the hypodermic morphia habit is lessening, and it is also true that insulin in diabetes and adrenalin in asthma

[1] Guy's Hosp. Gaz., Sept. 6th, p. 320.

call for more regular and quicker application of the needle than warrants a summons to the doctor, so that perforce we trust the hypodermic syringe into the patient's hands. But when once morphia injections have been begun it is often difficult to give them up, and the rapid acquisition of tolerance soon makes it hard to keep the patient under the influence of the drug. Dr. Witts also points out that intravenous medication in general is nowadays embarked on too lightly. Every kind of intravenous injection, he tells us, except normal saline, has at some time or other proved fatal, and no drug should unnecessarily be injected if it can be given by mouth. The popularity of injection is, of course, largely due to the accuracy of dosage which it allows.

THE COURSE OF EPIDEMIC ENCEPHALITIS.

IN a paper on prognosis for epidemic encephalitis in children,[1] Dr. H. A. Howe reviews a series of 66 cases which were under observation for from one to ten years after the acute onset. The development of so serious a sequela as parkinsonism long after the acute phase has made the prognosis unusually difficult in this disease. No true basis can be reached until some correlation is established between the symptoms and signs of the acute stage and those of the years of chronicity, but such a basis cannot be found if those who study the acute stage have no opportunity to follow up their cases, while those who study sequelæ have no particulars of the early symptoms. A further complication is that the sequelæ are often the first signs to be noticed, no acute stage of illness being observed at all. Indeed, it seems now to be definitely established—Dr. Howe found it so in 19 per cent. of cases—that there is an "abortive" form without any "acute illness of ordinary encephalitic type." This is not, however, to say that there were no recognisable symptoms: fever, over-activity, sleeplessness, and hallucinations were common features of such a case, followed soon by signs that are usually regarded as sequelæ. Howe attaches much importance to the fact that of his 13 cases of abortive type, while none died in the acute stage, 3 died later, 6 were at the end of six to eight years totally incapacitated, and 3 partially so; 11 of the 13 were parkinsonians. He distinguishes two other types of acute disease—the somatic, characterised by either paralyses or excitability of somatic or cranial nerves, and the meningitic, with signs of meningeal irritation. This last was the least serious: 9 out of 11 cases recovered completely. The somatic was the most fatal at the acute stage, and incapacity, partial or total, resulted in 34 per cent. From his survey he concludes that the most dangerous early sequela of encephalitis lethargica is intense over-activity, seen either in sleep disturbances or conduct disorders. This, he declares, is usually followed sooner or later by parkinsonism, which he regards as a final stage of a series of phenomena, of which over-excitability is characteristic. He separates from these, however, a milder type of emotional instability common after the somatic form, showing for a time considerable difficulty of behaviour, night-terrors, enuresis, and other symptoms, but ultimately improving or recovering. Howe claims that there is more than a mere quantitative difference between these two types of sequela, in spite of their similarity, but the important point for prognosis is that the symptoms of the dangerous type are always early in occurrence in the acute illness, either as over-activity, sleeplessness, bizarre behaviour, or hyperpnœa; disorders at a later stage have not so grave a significance.

Howe's paper is a positive contribution to our knowledge of this subject, and he draws support from a considerable section of the literature already available. Incidentally it is of interest to note that parkinsonism does not seem to be so common a sequela in America as in Europe. The 19 per cent. which he reports has been doubled and even tripled by many observers in this country, but, of course, the difficulties of early diagnosis still lend uncertainty to all statistical statements.

[1] Johns Hopkins Hosp. Bull., September, 1930.

HOLES IN DETACHED RETINA.

IN a paper published in the September number of the *British Journal of Ophthalmology*, Mr. J. Bruce Hamilton provides some information likely to be useful to those who propose to adopt Prof. Gonin's treatment by igni-puncture.[1] Holes may be very difficult to find, and it is, therefore, well to know that in shallow inflammatory detachments they are not likely to be present at all. Further, since sarcoma of the choroid is a not infrequent cause of detachment, it is as well to exclude this before spending much time in searching for a hole. It is in myopic and traumatic detachments that a hole is usually present, though it may be extremely small or may be actually hidden by a fold. Since holes are almost always in front of the equator of the globe, near the ora serrata, full dilatation of the pupil is essential. Three types of holes are found: (1) tears at the ora serrata of a crescentic shape; (2) small round holes associated with old choroiditis; and (3) horse-shoe rents. Multiple holes are not uncommon, and if they are left undetected the failure of operation is a foregone conclusion. If the detachment is above, the hole is also there, although it may be hidden by a fold. It may, however, become visible after a few days in bed. If the detachment is below, on the other hand, it by no means follows that the hole is also in that position. Sometimes a detachment below is divided by a deep cleft into two portions, and observers must be on guard against taking this cleft for a hole.

ASSISTANCE TO ALPINE TREATMENT.

WHEN the Queen Alexandra Sanatorium at Davos was closed in 1922 there remained a fund available for securing the advantages of sanatorium treatment in an alpine climate for persons of small means belonging to the English-speaking nationalities. The report for the year 1929–30 shows that 44 patients were helped to make a prolonged stay at Davos during last winter. The grant amounts to £2 (or 50 francs) a week, the recipients being allowed to choose their own accommodation from a list of approved houses. Eight of the patients received the grant for the maximum period of 197 days, the average stay being 153 days; 11 of them elected to stay in sanatoriums, 31 in pensions or small hotels, and 2 in private families. A condition of the grant, not easy to enforce in practice, is that it is not available for patients in an advanced stage of disease, and during last year the prevailing type of patient accepted was satisfactory with only four exceptions. Male patients were in order of frequency clerks, civil servants, accountants, and dentists; of the female patients five were nurses and four teachers. A pleasant feature of the year's work has been the number of letters

[1] See THE LANCET, July 19th, pp. 142 and 149.

received by the local secretary expressing gratitude for the grant and reporting satisfactory progress. Of the value of the Fund there can be little doubt, although the opinion may be based mainly on impressions; when the period of years is considered adequate an analysis of later results would help to place the Fund on a permanent basis. The visiting physicians at Davos are now Dr. Bernard Hudson and Dr. E. Nienhaus. Information in London may be obtained from either of the joint hon. secretaries to the Council: Miss M. Bulloch, 12, Thurloe-court, S.W. 3, and Mr. David Vesey, 97, Warwick-road, S.W. 5.

EFFECT OF ABNORMAL LABOUR ON THE CHILD.

THE possible after-effects of minor obstetric trauma have long given rise to speculation, especially in relation to such conditions as hydrocephalus and Little's disease. The suggestion that difficult labour may upset intelligence, even in the absence of gross cerebral trauma, has, on the whole, met with little support, since it apparently conflicts with positive evidence of a strong hereditary factor in amentia. To carry conviction observations must be on a very large scale, and they have so far been lacking. An attempt to fill this gap has been made in Massachusetts, where an investigation extending over nine years has included examination of over 20,000 children. The findings have been subjected to an elaborate statistical analysis, and are presented in a paper by Dr. Neil A. Dayton [1] which will occupy an important place in the literature.

Examination of 20,473 children (ages about 5 to 16) was carried out during 1921–30 by travelling psychiatric clinics originally devised by the late Dr. W. E. Fernald. The investigation followed the lines of the "ten-point scale," and included inquiry into abnormalities of the child at the time of birth and of the confinement. Labour was regarded as abnormal: (1) if it was prolonged—over 24 hours for primiparæ or 12 hours for multiparæ; (2) if operative procedures or instruments other than low forceps were used; or (3) if an unusually difficult labour was recorded. The material was divided into groups representing normal and abnormal labour in the mothers. It was at first subdivided into sexes, but as no significant difference was found in these subgroups they were amalgamated. The incidence of retardation (intelligence quotient below 0·7) in the children born in normal and abnormal labour was compared, and was found roughly the same. From the answers of a questionaire to 125 Massachusetts obstetricians the incidence of abnormal labour (as above defined) in the general population was estimated at the somewhat surprising figure of 70 per cent. Comparison of the figures showed that the incidence of abnormal labour in the histories of the groups of defectives and retardates was considerably below that of the general population. Further analysis of the figures showed that when the cases were ranged into groups according to the intelligence quotient there was no significant association between abnormal labour and true defect, but there was a definite association with a group representing "normal and dull normal" whose quotient was above 0·9 (74 per cent. of these were below 1). Dayton points out that a very large proportion of the population falls into this category, and he thinks the association may be of great importance. The absence of any association between abnormal labour and retardation in general was confirmed by another investigation into the average grade accomplishment of the children in various subjects to the school curriculum. Some interesting results also emerged from investigation of the physical characteristics of the children. It might be suggested that abnormal labour would lead to nutritional disturbance which would result in a diminished weight or height of the child at the time of examination. This was directly negatived by the results of analysis; no association was found with variation in the weight of the child, but there was a definite association with *over-average* height. Dayton suggests that these children were the larger at the time of birth, and thus more difficult of delivery. The incidence of specific pathological conditions was also examined; it was found that there was a significant association of abnormal labour with neurological defects, but not with physical defects in other systems.

In research of this kind the opportunities for error are great, as is well recognised by Dr. Dayton. It must also be borne in mind that statistics merely establish an association between two conditions, and it remains to be otherwise determined whether the relation is causal or whether the two conditions have a common origin. Nevertheless, it is only by such investigation that the preliminary data can be obtained.

[1] New Eng. Jour. of Med., August 28th, p. 398.

AIR AMBULANCE SERVICES.

THE Fourteenth International Red Cross Conference held in Brussels this month is giving further consideration to the use of air transport for civilian patients. Though few national Red Cross Societies are in a position to afford air ambulances of their own, satisfactory working arrangements have been made in certain countries between the Red Cross and the Government. Thus, the Swedish society provides its own aeroplanes and, in return for the services of army pilots and mechanics and the use of hangars and workshops, undertakes certain specific obligations, such as placing its aeroplanes at the disposal of Government in time of war. In Siam and the United States the societies have a working agreement with their respective Governments. In France des Gouttes and Julliot have recently prepared a draft of an additional convention for the adaptation to aerial warfare of the principles of the Geneva Conventions. This draft deals with the immunity to be enjoyed by air ambulances in time of war; but it is hoped that in peace-time also privileges will be given to ambulance aeroplanes, exonerating them from customs charges, according them priority in hangars and aerodromes, and enabling them to cross frontiers freely.

THE DEMONSTRATION OF RICKETTSIA IN MAMMALS.

THE difficulty of demonstrating rickettsia in mammalian tissue has been a weak link in the chain of evidence for the identity of typhoid virus and *Rickettsia prowazeki*. The same is true also of those typhus-like diseases, Rocky Mountain spotted fever and tsutsugamushi or Japanese river fever, for which a rickettsial origin is claimed. Nagayo and his colleagues, who have been largely responsible for the suggestion that the causal organism of tsutsugamushi fever belongs to the rickettsia, have now evolved a new method for the demonstration of these organisms in virulent material.[1] This consists in the inoculation

[1] Nagayo, M., Tamiya, T., Mitamura, T., and Sato, L.: Jap. Jour. Exp. Med., 1930, viii., 308 and 319.

of virus into the anterior chamber of the rabbit's eye. An acute iritis develops after an incubation period of four to eight days, and later the inflammatory process extends to the cornea with the development of a keratitis. The eye symptoms subside in one to two weeks, leaving, as a rule, a slight degree of corneal opacity, and the recovered eye is refractory to further inoculations. Both typhus and tsutsugamushi virus are capable of exciting this reaction, and passage can be achieved by means of the aqueous humour, though in the case of typhus virus this failed by the third generation owing to relative insusceptibility of the rabbit. Guinea-pigs and monkeys can also be used, and the immunity associated with recovery is strictly specific. The most interesting feature of this work is the observation that if the eye is extirpated at the height of infection rickettsia can be demonstrated in considerable numbers in scrapings taken from Descemet's membrane. This method should prove of great value, and the possibility of its employment in the study of filtrable viruses should not be overlooked.

B C G VACCINATION OF MEDICAL STUDENTS.

RECENT meetings[1] of the Medisinske Selskap of Oslo have considered the basis of modern antituberculosis work. Prof. F. Harbitz, representing the older school of pathology, defended its teachings with much eloquence. The younger school, represented by Dr. J. Heimbeck and others, professed itself deeply sceptical of the value of the sanatoriums and other institutions which have cost the country millions of kroner. This school would like to see antituberculosis work based on Pirquet tests, followed by B C G vaccination of all the Pirquet-negatives irrespective of their ages. Statistics and charts were presented in support of conflicting hypotheses on the development of tuberculosis in the various age-groups and the value of shielding infants from exposure to infection. Prof. Harbitz himself put in a nutshell the difficulties of the position:

"As a result of recent investigations," he said, "it is already claimed that our tuberculosis work should be completely revolutionised. It would seem that we must not in the future devote so much of our energies as we do at present in combating tuberculosis in childhood and limiting the possibilities of infection in these age-groups; for in so doing we are, it would appear, merely deferring the period of infection to the years of adolescence when infection is said to be particularly dangerous. Combating infection in childhood would, therefore, logically seem to be directly harmful; the right course would rather be to allow children to become infected so that they would pass into the age of adolescence with increased resistance to tuberculosis to which they are henceforth to be immune. But how are we to manage so that the child is exposed only to a benign and slight infection? No one can at present give a satisfactory answer, and the whole of this teaching seems to me to be dangerous and to depend on many unproven hypotheses and most uncertain factors. The beneficial work, which has hitherto been carried out, and which has assuredly contributed greatly to the limitation of infection in childhood, and thereby of the morbidity and mortality from tuberculosis in childhood, should, therefore, undoubtedly, be continued, even though more persons enter the years of adolescence with a negative Pirquet reaction."

Dr. Heimbeck offers suggestive figures in support of his own contentions. In association with Dr. O. Scheel, Dr. T. Skaar, and Dr. O. Thorrud, he has found that 56 per cent. of the medical students, who had not yet begun to walk the hospitals and come in contact with tuberculous patients, were Pirquet-positive—a ratio corresponding approximately to that found in other members of their class at the same age. But during the following two or three years of hospital service, 98 per cent. were, or became, Pirquet-positive. As many as 19 of this group of 339 students developed tuberculosis during this period. Supplementary investigations made between December, 1929, and May, 1930, have thrown new light on the fate of the Pirquet-tested students who were, in some cases, vaccinated with B C G between 1927 and 1929. This latest study deals with 183 students, the nature of whose Pirquet reaction was known before they began work in hospital. Among 88 who were Pirquet-positive from the outset, there was only one who developed clinical tuberculosis during his subsequent hospital service. Among 51 with a negative Pirquet reaction at the outset and not vaccinated with B C G, there were as many as six students who developed tuberculosis. Among the 44 whose Pirquet reaction was negative at the outset, and who were, accordingly, vaccinated with B C G, there was not one who developed tuberculosis. These figures are, of course, too small to be conclusive, but supported as they are by the earlier work of Dr. Heimbeck and his colleagues on probationers and nurses in hospital, they are significant.

[1] Reported in the Norsk Magazin for Laegevidenskaben: July, August, and September.

ENTOPTIC PHENOMENA.

The Section of Ophthalmology of the Royal Society of Medicine held their first meeting this session on Oct. 8th, when Mr. E. W. Brewerton delivered his presidential address on entoptic phenomena. Under this title he dealt with the subjective observation of objects within the eyeball. These are, in fact, shadows, thrown on the retina by objects in the transparent media of the eye, of a different refractive index to the medium in which they lie. It is not necessary that objects should be opaque in order to throw shadows. If they are not opaque those with a higher refractive index than the surrounding medium appear luminous with a dark border, and those with a lower index have a dark centre and luminous edges. The objects may arise from the cornea, the lens, the vitreous, or the retina. Before the advent of the ophthalmoscope, said Mr. Brewerton, their observation was considered to be of very great importance. Able oculists and physicists thought it worth while to devote hours to the detailed study of the phenomena and the literature of the subject was voluminous. At the present time so many elaborate instruments are available for the examination of the eye that older and simpler methods of subjective examination are seldom used. Various methods were now available for the subjective examination of the different media of the eye. To examine the pupillary area of the lens the best method was to make a minute hole in a piece of paper with the point of a very fine needle. If this was held between the eye and a bright electric light an illuminated area was visible in which many details could be made out, even in a normal lens. To examine the vitreous all that was necessary was to look at a bright light with the lids nearly closed, when many transparent curly bands with dark borders could be seen, some larger than others. The larger ones were further from the retina, and their shadows were magnified; strands close to the retina threw very small shadows. The subjective examination of the macular region could be effected by a light focused through the sclerotic, which showed up this region with astonishing details, the other parts of the retina being out of focus. It was not, of course, possible for an observer to see his own optic disc by this method. Mr. Brewerton concluded his interesting address with the suggestion

that trained observers, notably medical men, suffering from advancing cataract or from degeneration in the macular region, should make periodical subjective drawings which might prove to be of considerable value to ophthalmologists.

BRONCHOSCOPY IN SUPPURATIVE LESIONS OF THE LUNG.

As a pioneer in the science and art of bronchoscopy Dr. Chevalier Jackson has greatly advanced the scientific study of suppurative lesions of the lung, while perfecting the technique of clearing the way to promote their healing. Speaking at a general meeting of Fellows of the Royal Society of Medicine on Oct. 14th he gave it as his opinion that as long as drainage and ventilation were good the lung could resist any infection reaching it by way of the air passages, and that bronchial obstruction was the primary factor in every case of lung suppuration arising by this route. A foreign body is, of course, not necessarily responsible for the obstruction, although Dr. Jackson's reputation has given him unequalled opportunities, of which he has made full use, of detecting and extracting these. Obstruction by viscid sputum in asthmatic patients he finds to be a common cause, and believes that, in many cases diagnosed as asthma, the air-hunger is due to such obstruction and can be relieved by aspiration through the bronchoscope. This highly viscous sputum invalidates the two chief protective agents of the lung—the effective cough and the movement of the cilia. The plug of purulent sputum prevents air from entering to expel it from below, and the cilia, like bees in honey, are clogged and helpless. At this point Dr. Jackson believes a plumber is required to clear the tubes. The extraordinary valve action of certain obstructions was illustrated by a cinematograph projection of some of his diagrams. For example, a pedunculated growth at the junction of the bronchi to the upper and lower lobes was moved by the currents of air in such a way that during inspiration the lower bronchus was occluded, and during expiration the upper. In this way air entered the upper lobe but had no means of escape, while the lower lobe was pumped empty by expiration, but had no means of filling again; as a result emphysema supervened in the upper lobe and atelectasis in the lower, until bronchoscopy revealed the cause of the trouble. A small patch of chronic inflammation in a bronchus may act as an obstruction both by a reduction in calibre of the air channel from granulation tissue and by inhibition of the ciliary action. Stagnation occurs behind the lesion, and an occasional aspiration with the removal of granulations is apparently sufficient to maintain the patient in health. Among his most interesting results Dr. Jackson includes the cure of lung abscesses by repeated aspiration, the number of times which the aspiration was performed reaching 78 in one case. The patient in question insisted on this extreme perseverance, in the face of Dr. Jackson's contrary opinion, and proved by his recovery that he knew where his best hope lay. In other cases, however, three or four aspirations were sufficient to restore to the lung its defensive power, and to make the cough effective once more. The removal of stagnating pus inevitably benefits both the local and the general condition. Another type of case in which bronchoscopy has been of value is that of post-operative massive collapse of the lung, due to an obstructive atelectasis. If the secretion is pumped out the danger of subsequent suppuration is avoided at the outset. Among causes of obstruction other than pins and nuts, Dr. Jackson includes in his experience actinomycosis and blastomycosis, primary tuberculosis of the bronchus without lesions in the lung, portions of bone from operative procedures in the nose and mouth, and fragments of badly tempered instruments. He also finds that on occasion sputum obtained from the bottom of a cavity by aspiration will contain the causative organism of the lesion when the expectorated sputum is sterile. On more than one occasion he has discovered spirochætosis of the lungs in this way, with the result that the use of antisyphilitic remedies gave a complete cure of a previously chronic condition. In a short moving picture Dr. Jackson was able to demonstrate the technique of bronchoscopy with the aspiration of pus, injection of antiseptic agents, and, in one case, the dilatation of a stricture of a bronchus by bougies. No general anæsthetic was used for any of these procedures, which occupied only a few minutes; cocaine was used to anæsthetise the pharynx and larynx during the introduction of the instrument. A series of lantern slides of the conditions described illustrated the remarkably good results obtained by Dr. Jackson by the use of the bronchoscope, particularly in the aspiration of lung abscesses.

MESCALISM.

WITHIN the past two or three years the alkaloid mescaline sulphate has been increasingly used as a drug. According to Dr. Macdonald Critchley, who lectured this week to the Society for the Study of Inebriety and Drug Addiction, measures have been necessary to check the importation of the drug and to limit its sale. The use of this alkaloid has indeed, he said, become almost a cult, by reason of its peculiar pharmacological effects. It is neither an euphoriac, like cocaine and heroin, nor an exhilarant, but it possesses in unequalled manner hallucinatory properties. No other drug, not even cannabis indica, has the power of evoking such amazing visions, which are said to be bewildering in their complexity and beauty. The existence of a mescal addiction to-day in the great cities of Europe is of interest, because the drug really belongs to the deserts of Central America, and its addiction has been for centuries the perquisite of the Mexican and American Indian. Mescal, also known as peyote or peyotl, is a cactus indigenous to the Southern States of North America and to Central America. The pharmacological action of mescaline was first investigated in 1898 by Prof. W. E. Dixon, who found that it slows the heart-rate and increases the blood pressure in small doses, and in larger amounts poisons the respiratory centre. In small vertebrate animals there is a combined excitatory and inhibitory effect upon the central and peripheral nervous systems. The chief effect in man, however, is upon the visual and psychovisual areas of the cerebrum, and in a few years much work has been done, particularly in Germany, upon this aspect of the drug. Mescal intoxication shows itself in a state of prolonged visual hallucinosis, accompanied by vertigo, headache, nausea, confusion of thought, distorted vision, and profound disorientation in time. Dr. Critchley and a colleague, Dr. Ferguson, experimented with 0·2 g. of mescaline sulphate, and it is on these subjective experiences that his account of the visual phenomena was founded. Visions began to appear within 25 minutes after ingestion of the drug. At first they were simple in pattern and colouring, and were visible only with the eyes shut.

Later they became more complicated; they no longer comprised geometrical designs, but took on three-dimensional form, appearing as figures and scenes, all most brilliantly illuminated and coloured, and all changing with the utmost rapidity. The hallucinations now became apparent with the eyes open, though never to the same extent as when the eyes were closed. This bewildering state of hallucinosis reached its maximum in about 90 minutes, and persisted at this level for many hours. The visions did not entirely disappear for 24 hours. He described some of the visions in the words of the subject:—

"Yellow specks dotted upon a black background . . . they are becoming larger and more numerous, and are forming a pattern. Red is now the most prominent colour; the arrangement is like a carpet, consisting in concentric rectangles, dark-red, salmon-pink, blue-golden, and so on. Large white specks dart rapidly in from the periphery on to the carpet, like bright silver coins pouring into the centre—or else like white streaks of lightning. Everything is now moving; the carpet design is breaking up and gives place to a mass of bright spangles dancing rapidly all over the picture. . . ."

Later ". . . A meadow with buttercups and daisies; now it is changing into a stereotyped park, with a bandstand and with chairs, each one of which is whizzing rapidly round on its own axis. Butterflies are coming in from all sides; the bandstand has disappeared. The butterflies all collect into the centre and arrange themselves into a circular, brightly coloured flower-bed, rotating rapidly in a clockwise direction, in a most wonderful manner . . . now a huge field of primroses . . . a complicated pattern like Hampton Court maze, brightly coloured with objects moving quickly in a snake-like, sinuous fashion along the apparently endless pathways of the maze."

Speaking of the hallucinations themselves Dr. Critchley quoted the observations of Klüver that certain form-constants often recur, such as spirals, cones, lattice-work, geometrical figures, carpet-like patterns, and so on. The visions are always brightly coloured; no one tint preponderates. Sometimes colours are said to be present which have no earthly counterpart, and are consequently indescribable. A striking feature is the dazzling brightness of many of the hallucinations, which seem to be illuminated from within. The influence of suggestion upon the pattern or content of the hallucination is usually slight or non-existent; one cannot evoke a particular scene merely by effort of will. A particular feature—also pointed out by Klüver—lies in the frequent incompleteness of the visions, this quality being known as the "presque vu" phenomenon. The usual emotional content of the hallucinosis is described as one of amazement, awe, interest, and delight. Almost all writers have insisted that the most skilful pen or brush could not do justice to the marvel of the hallucinations. Metamorphosia or changes in appearance of external objects frequently occurs, the objects appearing too big or too small, or there may be an exaltation of stereoscopic vision so that details and minutiæ are strikingly enhanced. Newspapers, pictures, floors may look like relief-maps. Havelock Ellis said that "matting on the floor showed a very rich texture, thick and felted, and seemed to rise in little waves." Changes may occur in other sense fields. The faculties of taste, smell, and hearing may be enhanced or perverted. There may even be some intangible intermingling of the senses so that qualities of one special sense are described in terms of a different sense-faculty. The side-effects of mescal are of interest. The laboratory tests carried out at Yale by Prof. Angier have shown that mescal (1) interferes with the accuracy, precision, and steadiness of muscular movements; (2) retards visual apprehension; (3) reduces the accuracy and concentration of attention; and (4) lessens the memory of ideas. The effects of prolonged usage of mescal is readily observed among the Indian communities. While not a dangerous drug, mescal must be regarded as habit-forming, and all writers agree that it is harmful mentally, physically, and economically. Dr. Critchley spoke of some of the problems which arise in the study of mescal hallucinosis, and to the possibilities of this drug as a deliberate instrument in psychological and neurological research. For example, a minority of individuals experience no hallucinations while under the influence of mescal; some experience a gorgeous and multicoloured pageantry, others see only a medley of geometrical shapes. The visions evoke delight and amazement in some, and depression and fear in a few. The variation is probably to be sought in the particular psychological make-up of the individual. The scope of mescal in the field of therapeutics is almost unexplored. The Indian uses this plant for every manner of ailment, and attempts have been made to introduce peyotl into American therapeutics. From time to time reports have appeared as to its efficacy in the treatment of asthma, neuralgia, rheumatism, and neurasthenia. Dr. Critchley quoted some curious results that have been recorded in the treatment of blindness in tabes. It is said to have produced a temporary but very marked enlargement in the fields of vision and an increase in the visual acuity.

Lord Amulree, the new Minister for Air, who takes his title from a place in Perthshire, is brother of Sir James Mackenzie, who died in 1925.

Dr. T. G. Moorhead, Regius professor of physic in the University of Dublin, has been elected President of the Royal Academy of Medicine in Ireland.

Dr. J. M. Woodburn Morison, lecturer in radiology in the University of Edinburgh, has been appointed to the first chair of radiology in the University of London.

THE Harveian Oration on the discoveries which formed the starting-point of modern biological chemistry will be delivered by Prof. J. B. Leathes, F.R.S., at 4 P.M. to-day, Saturday, at the Royal College of Physicians of London. The Bradshaw Lecture of the College on paroxysmal tachycardia will be given by Dr. W. E. Hume on Nov. 4th, and the Mitchell Lecture on indications for treatment in pulmonary tuberculosis by Dr. L. S. T. Burrell on Nov. 13th.

WE publish this week an article from Prof. Edward Hindle on the transmission of yellow fever, written for the information of the Permanent Committee of the Office International d'Hygiène Publique. This Committee is now in session in Paris, and yellow fever is among the diseases which are left to the consideration of the Paris Office under the provisions of the International Sanitary Convention, 1928.

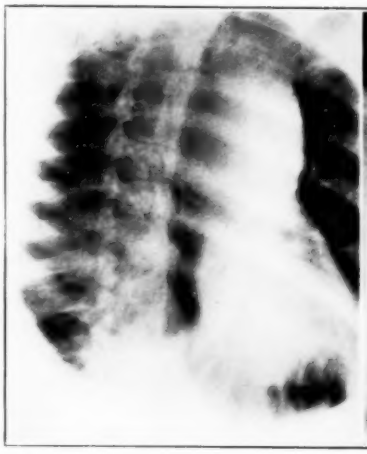
CENTRAL ASSOCIATION FOR MENTAL WELFARE.—A Conference on Mental Welfare will be held at the British Medical Association House, Tavistock-square, London, W.C., from Dec. 11th to 13th. An opening address will be given by Mr. Arthur Greenwood, Minister of Health, and subjects of discussion will include matters relating to the Mental Treatment Act, the Mental Deficiency Acts, and school reorganisation in connexion with the education of defective or retarded children. The address of the association is 24, Buckingham Palace-road, London, S.W. 1.

XXX

XXXII.

XXXIII.

XXXIV.



XXXV.

XXXVI.

XXXVII.

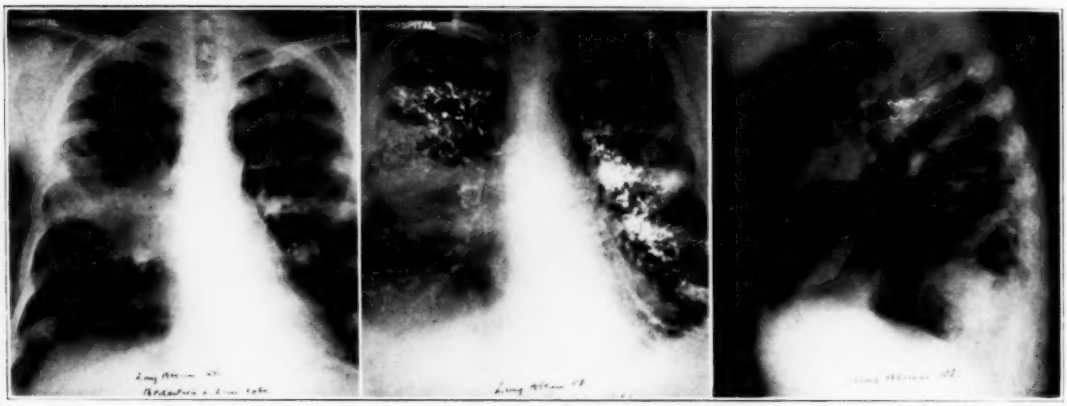
DRS. BURRELL AND MELVILLE:

INTERPRETATION OF RADIOGRAMS OF THE CHEST.

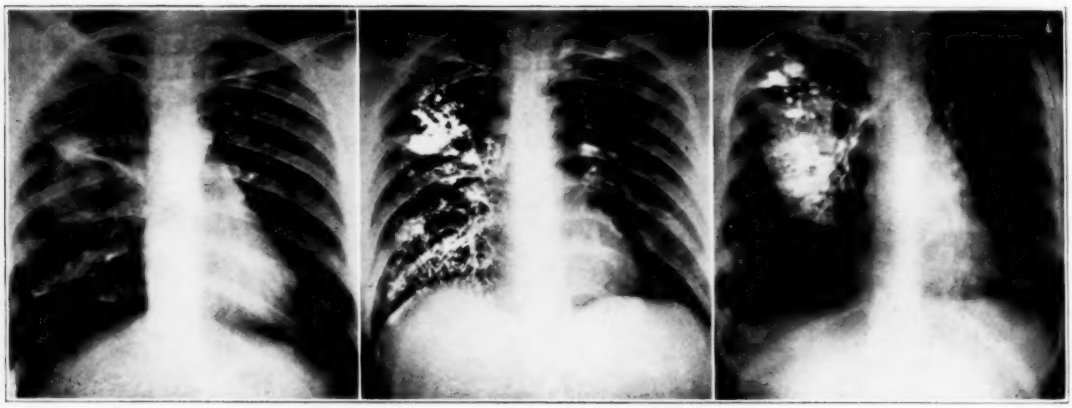
XXXVIII.

DR. SCOTT PINCHIN AND DR. MORLOCK: ABSCESSES OF THE LUNG.

I. II. III.



IV. V. VI.



DR. HERNAMAN-JOHNSON: DEEP X RAY THERAPY IN FRACTURE DUE TO METASTASIS.

I. II. III IV.

CLINICAL INTERPRETATION OF AIDS TO DIAGNOSIS

A Series of Special Articles, contributed by invitation.

LXXXVI.

RADIOGRAMS OF THE CHEST.

(WITH ILLUSTRATIVE PLATE.)

PART III.*

TUMOURS OF THE MEDIASTINUM.

As elsewhere, neoplasms in this region must be divided into those that are malignant and those that are non-malignant. The following tumours may be met with in the mediastinum: Inflammatory conditions (especially tuberculous glands); lymphoma and lymphadenoma; fibroma, lipoma, enchondroma, or a tumour with all these cellular elements combined; dermoid cyst and teratoma; hydatid cyst; sarcoma, especially of the lymphosarcomatous type; carcinoma; syphilitic gumma; and aneurysm of the arch of the aorta. The latter is included because of the vital importance of this condition in differential diagnosis.

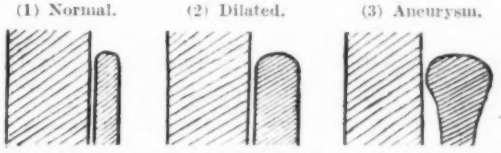
Mediastinal new growths may arise from the lung tissue, but this must be of extreme rarity; from the thoracic wall, that is to say, from the periosteum of the sternum (sarcoma may originate thus); from the bony structures as in the case of chondromata; from the mediastinal lymphatic glands, either primarily or by extension from the cervical or the posterior mediastinal glands; or from the thyroid or the thymus glands. The diagnosis of new growth, at least in the early stages, in this situation, is not without difficulty, nor does the clinical evidence assist greatly in differential diagnosis. Many of the physical signs are alike in all forms, and these are due in the main to pressure effect. Cyanosis, venous engorgement, and signs of collateral circulation are possibly more common in new growth.

* Part I., Normal and Infective Conditions, and Part II., New Growths of the Lung, have appeared in recent issues of THE LANCET.

Differential Diagnosis.

Differential diagnosis has to be made between (*a*) lymphadenoma, or Hodgkin's disease; (*b*) aneurysm of the arch of the aorta; (*c*) sarcoma growing either from mediastinal glands or from the remains of the thymus; (*d*) tumour of the thyroid gland.

FIG. XXXI.



Diagrammatic outline showing the appearance of the aortic arch as seen in the right oblique diameter against the spinal column. Comparing (2), the generally dilated arch of the aorta, with (3), aneurysmal dilatation, it will be seen that in the former the sides of the vessel are parallel, while the latter shows "clubbing."

LYMPHADENOMA.

The X ray picture is that of a fairly well-defined opaque mass in the mediastinum, usually unilateral. As a rule, characteristic glandular enlargements are met with elsewhere (in the neck, axilla, or groin). There is frequently a blood picture showing a moderate eosinophilia, progressive anæmia, with increase in the

LEGENDS TO ILLUSTRATIONS APPEARING ON SPECIAL PLATES.

DRS. BURRELL AND MELVILLE: INTERPRETATION OF RADIOGRAMS OF THE CHEST.

XXX. *Lymphadenoma.*—The mediastinum is wider than normal, the upper limit of the heart and great vessels being overshadowed by the mass. On the left side in the upper zone there is an irregular opacity suggesting the reaction of the lung tissue to the mediastinal growth.

XXXII. *Aneurysm of the arch of the aorta.*—The mediastinum is much wider than normal; the outline is sharply defined. (There are some calcareous plaques in the pleura of no special significance.)

XXXIII. *The same case* as in fig. XXXII. seen in the right oblique plane. The aortic arch is "clubbed," this clubbing being the characteristic feature of aneurysm of the arch. Note in lateral plane the bulging of the aorta both forwards and backwards.

XXXIV. *Aortic aneurysm* involving the descending aorta in addition to the arch.

XXXV. *Large aneurysm* of the arch, showing the marked displacement of the trachea.

XXXVI. *Lymphosarcoma.*—A large tumour invading the lung tissue, showing the irregular outline which is characteristic of this tumour as it spreads into the surrounding tissues.

XXXVII. *Lymphosarcoma of mediastinum.*—This shows widening of the mediastinum and somewhat simulates aneurysm of the aortic arch. The outline is not, however, quite so sharply defined and the ascending portion of the arch can be seen as a distinct shadow.

XXXVIII. *Tumour growing from the thyroid gland.*—This tumour is seen to be growing downwards behind the manubrium sterni, depressing the arch of the aorta which is indicated by an arrow. Lateral compression of the trachea is also to be noted.

DR. SCOTT PINCHIN AND DR. MORLOCK: ABSCESSES OF THE LUNG.

I. Lung abscess in right mid-zone.

II. Radiogram after lipiodol injection. The lipiodol has not entered the abscess, but has outlined the surrounding bronchi.

III. Lateral view, showing that the abscess is in hilar region, and involves the anterior portion of the lung.

IV. Abscess in right mid-zone. Artificial pneumothorax just started.

V. Lipiodol has entered the abscess.

VI. Radiogram from another case showing the treatment of an abscess by artificial pneumothorax. Lipiodol injection shows that the abscess and the associated bronchiectasis in the right upper lobe has not been completely collapsed, although the lower and middle lobes are collapsing well.

DR. HERNAMAN-JOHNSON: DEEP X RAY THERAPY IN FRACTURE DUE TO METASTASIS.

I. Right hip on admission to hospital (May 31st, 1928). Note shortening, and rotation of head of femur.

II. Condition on discharge (July 11th, 1928). Patient wearing Thomas's splint. Rarefaction at site of fracture, the significance of which was missed.

III. Condition on readmission (Oct. 26th, 1928). Note extensive area of "worm-eaten" bone. It was this picture that led to further inquiry into the patient's history.

IV. Radiogram taken on Jan. 31st, 1930, after treatment by extensive and deep therapy. Shows bone consolidated, and Shenton's curve almost restored. Patient walking well, with stick only.

leucocytes and frequently pyrexia, all of which, if present, are helpful in diagnosis (fig. XXX.).

ANEURYSM OF THE ARCH OF THE AORTA.

The differential diagnosis of this condition is not without difficulty, but much help can be obtained from the history and the absence or presence of a positive Wassermann reaction. The X ray examination shows a well-defined rounded opacity in the upper part of the mediastinum. Examination in the lateral oblique plane is essential, and will show the presence of "clubbing," which is characteristic (figs. XXXI. and XXXII.). The clinical evidence of involvement of the recurrent laryngeal nerve is of the greatest value. At one time it was stated emphatically that if pulsation could be seen, the diagnosis of aortic aneurysm could confidently be made. This is not the case, for many mediastinal tumours will exhibit acquired pulsation from their relationship to the aorta, which cannot be distinguished on the fluorescent screen. The time factor is of service; if signs have persisted for about 18 months, the evidence is in favour of aneurysm (figs. XXXIII., XXXIV., XXXV., and XXXVII.).

SARCOMA OF THE MEDIASTINUM.

Though originating on one side, a lymphosarcoma frequently invades both sides of the mediastinal space, causing lateral compression and deviation of the trachea, definite signs of compression, and interference with the circulation. There is frequently a transmitted pulsation, equal to or greater than that seen in a large, consolidated aneurysm. To determine whether or not pulsation is transmitted is a difficult, if not an impossible, matter. This tumour differs from aneurysm in that it less frequently causes erosion of the bony structures, but this is by no means an invariable rule (figs. XXXVI. and XXXVII.).

TUMOUR OF THE THYROID GLAND.

Examination in the lateral plane will reveal a tongue-like process growing downwards and forwards and *depressing the arch of the aorta*. This depression of the arch clearly demonstrates the situation of the growth. Such tumours are of rare occurrence (fig. XXXVIII.).

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and

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SPECIAL ARTICLES

RESEARCH IN MENTAL HOSPITALS.

THE first part of the second volume[1] of the Annual Report of the Board of Control is devoted, as usual, to reports from the various mental hospitals of research work undertaken by them during the year.

The most bulky communication comes from the Joint Board of Research for Mental Diseases of the City and University of Birmingham, where research has been directed towards the ætiology of and primary changes in chronic disease, especially in the neighbourhood of the brain. In a large proportion of cases changes have been found post mortem in the sphenoidal sinus and antrum, and often there are septic remains of adenoid tissue. It has been shown that anoxæmia of the brain may cause mental derangement. Reports from each of the visiting specialists are printed, and among cases reported in detail are one of *B. pyocyaneus* infection, one of oro-naso-pharyngeal sepsis and atheroma, one of polycystic disease of the kidneys, pyonephrolithiasis and nasal sinusitis, and four illustrating the relation between mental disease, sphenoidal sinusitis, the pituitary gland, and the pyrexial response to foreign protein. Eleven cases of exophthalmic goitre suggest that local treatment of the goitre cannot be relied upon to cure any associated mental disorder.

At St. Andrew's Hospital, Northampton, a study has been made of gastro-intestinal focal infection in relation to oral sepsis. Sepsis in the mouth can usually, they find, be traced right through the digestive tract, but anaerobic methods are essential. At Hellingly uræmia and high urea contents are being investigated, as they have been found in a high percentage of cases, suggesting widespread renal damage among the insane. Croydon also finds a perfectly healthy kidney very rare in the mental patient.

[1] H.M. Stationery Office, 1930, pp. 403, 6s. 6d.

STUDIES ON THE BLOOD AND METABOLISM.

At Colchester blood cholesterol has been studied. It is raised in dementia præcox and manic-depressive insanity and, less constantly, in other psychoses, but not in imbecility. States of confusion, excitement, and depression are accompanied by a fall, which appears to be a normal part of the emotional reaction. At West Park an investigation has been made into the distribution of chlorine in the blood and urine: psychotics showed a varying degree of retention, together with a varying degree of defect in respiratory regulation in the early morning. In katatonic dementia præcox there is a reversal of the normal shift of chloride from plasma to corpuscle during sleep, and exercise causes a decrease in the acid load of the corpuscle. Barnwood House has made a special study of indicanuria and finds that patients benefit from high colonic lavage; this method of treatment has also been found valuable for a variety of cases at St. Andrew's Hospital, Northampton. Oxford is also studying the excretion of indican as well as encephalitic material.

The carbohydrate metabolism in psychotics has been investigated at the Cardiff City Mental Hospital, and work has been commenced on the oxidative and enzymic processes in the brain. There is some indication that certain oxidative changes in the cell are powerfully influenced by adverse environmental circumstances, whereas other changes proceed normally. The Calderstones Mental Deficiency Institution has been studying the sigma reactions of the blood of defective epileptics. A number of hospitals are using the Meinicke micro-reaction as a routine, but reports vary somewhat. Some find it much more convenient than and quite as reliable as the Wassermann; others do not find it so satisfactory, especially on the cerebro-spinal fluid, for which Kirkburton has found the Boltz acetic anhydride test to agree 100 per cent. with the Wassermann. At Lancaster, on the other hand, a negative Boltz is not regarded as reliable. The Leicester City Mental Hospital compares

the Vernes test with the Wassermann and considers it worthy of further study.

Whittinghame has been trying a ketogenic diet in epilepsy, but finds it too severe for most adults; in 10 out of 36 patients there was a definite reduction in the number of fits, but no complete arrest. At West Park a carbohydrate and alkali diet has given no clinical improvement in dementia præcox except that the stuporose cases tended to become more active; they also showed some benefit after injections of sulphosin.

Diabetes Insipidus and Chronic Encephalitis.

Work on diabetes insipidus at Wadsley has shown that this condition may be due to a transient affection of the pituitary glands which may disappear completely, but a more severe affection—e.g., a congenital defect—may be permanent. The polyuria may be brought about by inhibition of secretion of the posterior hormone, owing to a mild lesion in the hypothalamic region stimulating an inhibitory centre or tract to the pituitary. A severe hypothalamic lesion does not cause diabetes insipidus.

The pituitary has been examined in chronic epidemic encephalitis and changes have been found quite frequently. In some cases hyperplasia was found in the anterior lobe and the pars intermedia and in others atrophy, destructive changes, or hæmorrhages. In all cases there was great congestion in the anterior lobe and in two there was a good deal of colloid in the pars intermedia. In the hypothalamic region there were also changes which did not necessarily run parallel with alterations in the rest of the nervous system. Hæmorrhages were commoner here than in other parts of the body. It has been found that the brain may be very abnormal chemically while appearing healthy. The increased calcium content in chronic epidemic encephalitis may bear some relation to the sleep disturbances and to the sudden deaths. In general paralysis, arterio-sclerosis, and Huntington's chorea there is great loss of phosphorus, but in encephalitis the phosphorus is usually about normal.

Treatment, especially that of G.P.I.

From Rainhill comes a report on sulfosin and nirvanol in general paralysis. The former is harmless, but has proved useless unless the temperature reaches 103° F.; the latter is dangerous, as the pyrexia is uncontrollable and uncertain. At Claybury, on the other hand, sulfosin is favourably regarded. From Winwick and from several other hospitals come interesting case-reports and discussions on malarial therapy. At the Maudsley Hospital tryparsamide has been found valuable, both as a substitute for, and as an adjunct to, malarial therapy in general paralysis. At Stafford tryparsamide has been abandoned in favour of sulpharsenol and biscam. At the Norfolk County Mental Hospital Ducrey's bacillus, marketed as Dmelcos, has been tried with very satisfactory results. It can be safely used where malaria is contra-indicated or cannot be tolerated. A case of tabo-paresis was treated with tryparsamide with remarkable success at Wonford House Hospital, Exeter. At Fareham various drugs have been used for epilepsy, with the conclusion that the bromides and phenylmalonyl-urea compounds are the most useful. The prophylactic value of iodine in influenza is being tested at Whittinghame, and Winwick gives a summary of the effects of actinotherapy. Napsbury reports on protein therapy with T.A.B. vaccines, and Croydon has found glucose useful in epilepsy during the course of an investigation into the liver function in epilepsy and dementia præcox. The treatment of varicose veins by injection in 17 patients is recorded from Parkside, whence also comes a study on the relation of the cause of death to the type of insanity which opens up many interesting possibilities. The incidence of cancer for 25 years has been found at Rainhill to be 3·77 per cent. as contrasted with 13 per cent. for the general population. At Bexley a study is being made of a group of patients suffering from a chorea which seems to be clinically indistinguishable from Huntington's but not to show the usual family history. The West Riding and Lancashire Mental Hospitals have been occupied with systematic searches for organisms of the typhoid-dysentery group. The problem of diagnosing pulmonary tuberculosis in mental patients who yield no sputum has been solved at Stafford by examination of the fæces, and the Royal Eastern Counties Institution at Colchester has succeeded in eliminating diphtheria by routine use of the Schick test.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

ROYAL ACADEMY OF MEDICINE IN IRELAND.

Prof. T. G. Moorhead has been elected President of the Academy, the sectional presidents for the coming session being Prof. H. F. Moore, Mr. R. A. Stoney, Prof. A. H. Davidson, Dr. J. Lait, Dr. C. P. Martin, and Prof. W. D. O'Kelly.

ROYAL VICTORIA HOSPITAL, BELFAST.

Dr. J. S. Morrow has resigned his appointment as senior physician after an association of 27 years with the hospital, and has been appointed consulting physician. The medical staff has placed on record a tribute to his distinguished service to the hospital as teacher, counsellor, and physician. Dr. Robert Marshall has been promoted to physician in charge of wards, and Dr. R. Sydney Allison, now one of the physicians to Ruthin Castle, has been elected assistant physician to out-patients. Mr. A. B. Mitchell, F.R.C.S.I., consulting surgeon to the hospital, has been appointed chairman of the board of management in succession to the late Marquis of Dufferin and Ava.

SOME ASPECTS OF MEDICAL HISTORY.

At the opening of the winter session Dr. S. B. Boyd Campbell delivered the annual oration in the King Edward VII. Memorial Hall of the hospital on Oct. 9th. Mr. T. S. Kirk, senior surgeon, occupied the chair. Dr. Campbell traced the slow development of hospitals from the temples of Æsculapius; he showed how the training of nurses was the first step towards the efficiency of the modern hospital by the introduction of cleanliness; and he described vividly the struggle of truth against Galenical tradition and superstition. Speaking of epidemics in ancient times he described how the best precautionary methods were administered as three adverbial pills: "Go quick, go far, and return late." He compared this with the successful methods adopted to stay the outbreak of plague in San Francisco in 1900 by the slaughter of millions of rats and ground squirrels. He recalled how Simpson was denounced in the pulpit for the use of chloroform, and his reply to his critics. The strange drugs used in bygone days furnished an interesting part of his address; one of them, the "everlasting pill," mentioned in the Supplement to the Pharmacopœia as late as 1849, was a small

globule of metallic antimony which was believed to act as a purgative as often as swallowed. A lady alarmed at the non-recovery of such a pill was reassured by her physician: "Madam," he said, "fear not, it has already passed through a hundred patients without any difficulty." Dr. Campbell recalled that the British Government refused to buy seeds of the cinchona plant obtained at great risk. The Dutch Government bought half of them for £33 and raised 20,000 plants—the beginning of the Java industry from which millions of money have been made. Prof. W. W. D. Thomson, in moving a vote of thanks, mentioned that in 1935 the Belfast Medical School would be 100 years old, and regretted that the history of their school was still unwritten.

TYRONE COUNTY HOSPITAL.

The Duchess of Abercorn has opened a new home for the nurses of the Tyrone County Hospital at Omagh. The building, which will accommodate 30 sisters and nurses, comprises lecture and class-rooms, and liberates a number of rooms in the hospital which can now be made into wards.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

MR. GANDHI AND THE PUBLIC HEALTH.

POLITICAL questions have bulked so largely in India lately that it cannot be wondered at if other aspects of life have received less public attention than usual. There are, however, keen observers outside India who are watching closely the sequence of events, and nowhere is more interest displayed than in America. Miss Mayo, for instance, evidently keeps in touch with the Indian news, and she has a remarkable article in the September number of the *Atlantic Monthly* about Mr. Gandhi's recent activities which is worthy of attention both from the medical and social points of view. It is, perhaps, not generally realised that, apart from politics, Gandhi was at one time the most enterprising and energetic of all the modern Indian social and hygienic reformers. It was probably in connexion with his ambulance work with the British forces in the Boer war that his name first became widely known to the British public, but for many years he has been exposing the shortcomings of his fellow countrymen in social matters and public health, setting a practical example in his own person, usually on very sound lines. Of late, in his bitter hatred of the British connexion, these original objectives have been obscured, and he has frequently selected modern scientific medicine for his most virulent abuse, in spite of the inconsistency, which he has admitted, of resorting to a British surgeon for operation in his attack of appendicitis. In his new mentality he has developed a special dislike for anything in the nature of inoculation, denounces vaccination as a dangerous and filthy habit, and continues to oppose the practice in spite of a recent outbreak of small-pox amongst the unprotected children of his *ashram* at Ahmedabad. The upshot is interesting—at the very time chosen for his march to the sea to manufacture illicit salt in defiance of Government, his headquarters were, as Miss Mayo says, a small-pox pest centre. It was under these conditions that he started with 79 disciples to travel 160 miles or more across a populous countryside. What might have been expected happened. Day by day men dropped from the ranks stricken by small-pox, to be left behind in villages and form centres of infection along the line of march. In due course, it is stated, while the Bombay Presidency as a whole reported a decrease in the disease, the figures rushed up in the particular section through which the pilgrimage had taken place.

It is clear from other circumstances that Gandhi's interest in social welfare has now fallen into the background of his thoughts. One of its main features was opposition to child marriage, while, as it happened, his march coincided with the last few days before the Sarda Act (the measure prohibiting the marriage of girls under 14 years of age) came into force, and with the phenomenal rush of Hindu families to get their children married, before it became illegal, which characterised certain districts at that time; so that all along the route the people's most pressing interest was the wedding of girl babies. But it would appear that Gandhi took no note of it, so wholly has sedition become his religion. He said so, and he appealed to his hearers to make it theirs, disregarding, for the most part, the glaring scandal of the child marriages. In like manner he appears to have deserted the cause of the untouchables of late. In proportion as they support the British *raj*, and show their dread of being handed over to their high caste compatriots, he has appeased them with expressions of sympathy. Let them wait for national independence, he says, and all the rest will follow. But the depressed classes are not prepared to accept his advice. There is an old Indian proverb that if you live by the ford it is wise to make friends with the crocodile. The untouchables evidently think it is still wiser not to live by the ford. Meanwhile their quondam champion, temporarily laid on the shelf in the Yeravda Prison, retires further into his veil of mysticism, and is now apparently chiefly concerned in considering whether it is or is not sinful for him to drink milk. Cow's milk, and buffalo's, he is vowed against, but might he take goat's, with safety to his soul? If he does not his doctor has told him he will die. But milk, except for babes, is an unnatural food, and it is a question, which he puts to himself, whether he should indulge in it at all. Incidentally a very serious question for vast numbers of his countrymen, if they are to follow his lead, depending, as they do, on milk for a large proportion of their protein. But whichever way Gandhi's decision may lie, one may at all events be certain that fear of death will have no influence, for imprisonment has always been a welcome relief to him from the world's turmoil, and to cease from living he would probably regard as a happy release.

MEDICINE AND THE LAW.

Lump-Sum Bill or Details?

IN the middle of last month a correspondent asked in the columns of the *Times* if there was "any reason why doctors should not send in their bills in a more businesslike and detailed form." Everyone, he said, feels the doctor's bill as a blow in the dark, and pays it "with some resentment, not knowing whether or not he has been fairly dealt with." Subsequent correspondents warned the original letter-writer that, if he had a detailed account, the bill would probably be heavier. The odd pounds would cease to be knocked off; the extra charge for night visits might be insisted upon. One writer pointed out that the patient can keep a note of all the doctor's visits if he wants to know what the bill means. Another

suggested that the patient, if dissatisfied with the lump-sum bill, should ask for details; or, better still, he might prevent all future doubt by paying cash at each consultation. Towards the end of the holiday season the correspondence languished. It revealed no widespread grievance on the part of the public.

A medical practitioner can, if he chooses, attend a patient on the understanding that his services are not to be remunerated. If there is no such understanding, the practitioner is prima facie entitled to reasonable remuneration for services rendered. In the last resort it will be for the court to interpret the word "reasonable" in terms of pounds, shillings, and pence, after inquiring what the services were and what are the circumstances of the parties. These last resorts, however, are expensive and disagreeable. To quote "The Conduct of Medical Practice," it is as well that the scale of the remuneration should be agreed with the patient at the outset, whenever possible, to avoid misunderstandings. Legally there is no need to agree the scale in advance; but legally there is a duty to explain, if asked, how the lump-sum bill is made up. It will probably be the experience of most practitioners that the patient is more interested in the total than in the details.

The Need of Patience.

A Liverpool physician, giving evidence lately in a compensation case in the county court, stated that he had examined the workman on behalf of the employers on a certain date. In cross-examination he was asked if the workman did not complain of pain at that examination. He replied in the negative. Cross-examining counsel, having received an unfavourable answer, put the question again, suggesting that the patient had complained of pain during the interview and that the witness had pooh-poohed the complaint. The practitioner repeated his denial. Thereupon counsel is reported to have said: "I suggest that that is not true, doctor; I have had to put similar questions to you before in other cases." Though a cross-examiner may be entitled, by the licence allowed him in the law-courts, to repeat a question several times and to put an allegation of perjury in the form of a question, it seems entirely improper that he should further add, in the form of a statement made as of his own knowledge, an offensive observation purporting to convey that the witness has committed similar perjuries in his hearing in other cases previously. If counsel are to give evidence on these lines they should go into the witness-box and be in turn submitted to cross-examination. What is a witness to do who is subjected to such discourtesy? He should appeal to the judge for protection, if necessary. Unfortunately, though many good judges would have sternly called upon counsel to withdraw an improper observation, the court on this occasion declined to interfere. Counsel, said the judge, are entitled to ask questions in accordance with their instructions.

There remains, then, for anyone who has the discomfort of giving evidence the need of infinite patience. Advocates may make it their object to provoke him into loss of temper; they must not be gratified. They may hope for a display of partisanship; they must be disappointed. If some day the public comes to the conclusion that mud-slinging under cover of legal procedure has gone rather too far, patience may have its reward.

PUBLIC HEALTH SERVICES

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are 1929 statistics of four seaport cities:—

Name of district and estimated (R.-G.) mid-year population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality from childbirth.
Bristol (391,000)	15·6	13·0	1·21	1·39	2·3	2·6	60/32	32	4·4
Hull (299,900)	20·3	15·2	1·24	1·34	3·6	2·5	104/35	71	4·4
Portsmouth (242,000)	16·8	13·8	0·94	1·54	2·7	2·5	66/26	33	3·4
Cardiff (224,200)	17·5	12·9	1·34	1·27	2·3	2·1	84/37	53	3·6

Stillbirths per 100 live births: Bristol, 4·5; Hull, 4·3; Cardiff, 5·0.

Bristol.

Dr. R. A. Askins says the general death-rate was 1·8 higher than in the previous year, principally owing to influenza. Diphtheria was also twice as prevalent as in the previous year and the type of the disease was more severe. There were 1132 cases with 62 deaths (60 of which were of children under 15 years). In order to facilitate the immediate use of antitoxin, an arrangement has been in force since October, 1924, by which practitioners are kept supplied with a stock of antitoxin available for poor patients at the cost of the health committee. A second whole-time maternity and child welfare doctor has been appointed and a scheme has been approved and plans prepared for a central clinic, which will replace a number of existing clinics held in unsuitable buildings. There are seven municipal antenatal clinics, which were attended by 2241 new cases. Five maternity hospitals also hold antenatal clinics. The need for postnatal examination of the mothers is recognised but is not feasible at present owing to the lack of suitable premises.

There were 11 cases of encephalitis notified and nine of them proved fatal. Seven cases of cerebro-spinal meningitis were notified with six deaths. On March 3rd the medical officer of health was asked to see two cases diagnosed as hæmorrhagic small-pox, but ultimately decided to be cerebro-spinal meningitis. One boy, aged 1 year 4 months, was found to be dead with an intense hæmorrhagic rash, another was ill (he died on March 17th) with a similar rash. Both children had gone to bed well on the previous night. On March 8th a third child in this family, aged 2 years 11 months, who was quite well on the previous day, developed a hæmorrhagic rash and died the following day. The remaining child, a boy of 5, escaped infection. Under the Local Government Act, 1929, the poor-law Southmead Hospital will be appropriated as a general hospital by the health committee and the health committee will become responsible for the maintenance of all children who came under the purview of the poor-law. The poor-law medical officers will form part of the staff of the medical officer of health. The medical superintendent of the mental hospital will become responsible

for all residential institutions for mentally affected persons, and will also conduct an out-patient clinic for mental cases at Southmead Hospital.

The housing committee, as opportunities occur, acquires unfit houses and reconditions them by "direct labour." Forty-four houses were dealt with in this manner during the year, and 21 more were similarly reconditioned for the Bristol Churches Tenements Association, Ltd. Since 1919, 971 houses have been demolished and there still remain hundreds which ought to be so treated. Section 3 of the Housing Act, 1925, has been found useful, and in 15 cases out of 53 the Council did the work in default of the owners.

Hull.

Dr. W. M. Frazer presents the report although he only took over the duties on Dec. 2nd in succession to Dr. W. Allen Daly, now an L.C.C. principal medical officer, who ceased work in Hull in October. The death-rate was 1·4 higher than in the previous year and the infant mortality-rate 104 as compared with 79 in 1928. The rise in infant mortality was due to an epidemic of pneumonia in February and March and to the increased prevalence of diarrhœa in October.

One of the events of the year was the opening of the Hedon-road Maternity Home and Infants' Hospital. This consists of six pavilions and an administration block and will provide 49 beds for maternity cases and also for puerperal fever and pyrexia, ophthalmia neonatorum, and venereal diseases in pregnant women. It has been decided as a result to close the maternity wards of the poor-law institutions as from April 1st, 1930, and to concentrate this work at the new home. All women who apply for admission to this home or for the services of the municipal midwife are required to attend an antenatal clinic. The number of patients seen at the antenatal clinics was 1737, and amongst these there was only one maternal death. The total births numbered 6095. The mothers confined in the maternity home or attended by the municipal midwives were invited to attend the postnatal clinic. These mothers numbered 1050 and 291 accepted the invitation. The scheme for providing home helps is giving satisfaction, and during the year 148 cases were attended by 31 approved home helps. Another event was the opening of the East Hull Clinic, which enables the residents of East Hull to obtain public medical services at one centre, which formerly they could only secure by attendance at six different addresses. Plans of both these new buildings are given in the report.

The interchange system begun in 1928, by which the medical officers of the department are available for work in any section, is proving very satisfactory and also popular with the medical staff. On the one hand it is useful in case of emergencies such as an epidemic of small-pox and, on the other hand, it gives the staff a wider experience and outlook. The extension of the city has added 4033 acres, making a total of 13,392, and bringing the outside housing estates within the boundary. The municipal houses completed numbered 454, about half as many as in 1928. There is still a vigorous demand for all types, except for certain houses on the East Hull estate, where, at the end of the year, there were vacant "33 central-heated parlour houses of construction other than brick." At the end of the year an important scheme was begun for the scheduling of all insanitary houses within the city. The housing staff was reinforced by the temporary help of ten sanitary inspectors for this work. When this survey is completed and knowledge of foreshadowed legislation is exact, it is hoped to draft an effective programme, covering a period of ten years for the clearance of all the present slums. The privy conversion scheme has been completed with remarkable rapidity, and a new modern plant for the disposal of domestic refuse was opened by Mr. J. C. Dawes, inspector of the Ministry of Health in September.

The administrative scheme under the Local Government Act, 1929, is well in hand. The Public Assistance Committee is the health committee with coöpted members (including four women), equal in number to half the health committee. The Public Assistance Committee has no power to raise a rate, borrow money, alter the scheme, or make a contract for more than £500, but is charged with the care and maintenance of all persons who required relief in poor-law institutions or out-relief. For the first time large hospitals for general medical and surgical purposes will be at the disposal of the local authority, and experience will show how this hospital service can best be used for raising the health standard of the community.

Portsmouth.

Dr. A. Mearns Fraser shows that the general death-rate was nearly 2·0 higher than the average for the previous ten years, and that the infant mortality-rate was 66 as compared with 60 for the previous decade. Deaths attributed to influenza numbered 154 and the increased infant mortality was due to the greater prevalence of summer diarrhœa. The notified cases of diphtheria were 766, of which 727 were removed to hospital and 24 died. The hospital accommodation proved inadequate and in June it was decided to increase it by 84 beds, at an estimated cost of £32,000. Hitherto children, convalescent from diphtheria, have been allowed to return to school in a fortnight after discharge from hospital, but a new procedure has now been adopted under which swabs are taken from the noses and throats immediately before return to school. By this means a number of children with diphtheria bacilli still in their throats have been prevented from resuming school.

Dr. A. Cambell, medical officer of the V.D. clinic at the Royal Hospital, is specially gratified at the result of treating children suffering from congenital syphilis. The number so treated has been about 600, and with few exceptions they are growing up as healthy members of the community. There is an increase in new cases of male syphilis, chiefly among sailors and general labourers. The former contract the disease abroad, the others chiefly in Portsmouth.

The new combined maternity hospital and child welfare centre was opened in April. Additional medical staff is required for the centre. There are frequently over 100 infants in one afternoon, of whom 60 should be seen by the medical officer, but there is only one medical officer. Midwives attended about 75 per cent. of the births and 1768 expectant women paid the 5*s.* premium to ensure against the fee of the doctor should he be needed. For the insured women a doctor was sent for in 38·5 per cent. of the cases and for uninsured women a doctor was sent for in 24·2 per cent. The insurance scheme is more costly for the health committee, but Dr. Fraser thinks it is worth it, so long as medical assistance is not sent for, "just because the patient is insured." The scheme saves collecting and clerical expense and relieves the mothers of a good deal of anxiety.

Cardiff.

Dr. R. M. F. Picken says the year 1929 was one of departmental stocktaking rather than of administrative progress. Among general sanitary needs he mentions the relief of overcrowding in dwelling-houses and improvement of living conditions generally. Among the houses visited during the year on account of birth or tuberculosis notifications or for housing records, numbering some 4000, over 50 per cent. were occupied by more than one family. The dwelling-houses number 43,000. Not more than 20 per cent. have sanitary dustbins and there are approximately 14,000 insanitary hand-flushed closets. Dr. Picken goes on to give a long list of new accommodation needed at the hospitals. Since the passing of the Local Government Act the Council has become responsible for institutions containing over 2000 beds, mostly reserved for the population of the city, whilst

of the 677 beds of the voluntary hospitals less than half are regularly used by Cardiff residents. Dr. Picken also has lists of requirements for maternity and child welfare, the school health service, and for mental deficiency and juvenile delinquency.

Dulwich House, a bequest from the late Lord Pontypridd, was opened on April 8th for the reception of children suffering from early acute rheumatic conditions. Cases for admission are selected at a special rheumatic clinic, at which 215 children were under observation during the year. Seventy-two children were admitted to the hospital all of school age. An endeavour is made to exclude children with established heart lesions. In 31 the heart was involved to a minor degree, in 8 to a serious extent, and in 33 it was not definitely involved. As a rule the lesser degrees of heart involvement tended to clear up, but in four cases the condition progressed steadily and had become permanent before discharge. This study of the earlier phases of rheumatic carditis promises to be a very interesting one. All the cases discharged come under the observation and supervision of the clinic. Prof. E. P. Cathcart, Glasgow University, has carried out an investigation of the dietaries of 56 of the poorer working-class families in Cardiff, which suggests that the Cardiff families are better off, as regards dietary, than Dundee and Glasgow families of similar circumstances. As the family income increased the most marked feature was a rise in the consumption of fat. The children in the families investigated were very slightly below the average Cardiff school-children in height and weight.

For two years complaints have been received as to the occurrence of urticaria among the bathers in Roath Park lake. Careful investigations indicate that the eruption is due to a water snail (*Limnæa stagnalis*) infected with *Cercaria elvæ*, which has been the cause of similar outbreaks in the United States of America. This water snail was not known in Cardiff until 1915. The lake was treated with copper sulphate in March, 1930, but in July there was a recurrence of the eruption, and the snails and cercariæ were again found. The treatment of the water has been repeated but its efficacy is still in doubt. Small-pox was introduced five times during 1929. There were only eight cases, however, and this experience confirms the view as to the low degree of infectivity of the prevailing type. Of the eight cases, seven were unvaccinated and one case, over 40 years old, had been vaccinated in infancy. During the year an arrangement was made with the Queen's Institute for the home nursing of cases of pneumonia, and 49 cases were so nursed.

The problem of the infestation of the houses on the corporation estates with vermin has assumed serious proportions. Details are given of the strenuous efforts which are being made to prevent this nuisance.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED OCT. 4TH, 1930.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 74 (last week 82); scarlet fever, 1998; diphtheria, 1306; enteric fever, 50; pneumonia, 516; puerperal fever, 39; puerperal pyrexia, 91; cerebro-spinal fever, 8; acute poliomyelitis, 22; acute polioencephalitis, 2; encephalitis lethargica, 7; continued fever, 1; dysentery, 9; ophthalmia neonatorum, 100. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Oct. 7th–8th was as follows: Small-pox, 168 under treatment, 1 under observation (last week 196 and 2 respectively); scarlet fever, 1523; diphtheria, 1828; enteric fever, 22; measles, 97; whooping-cough, 128; puerperal fever, 16 (plus 6 babies); encephalitis lethargica, 117; "other diseases," 28. At St. Margaret's Hospital there were 12 babies (plus 3 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 2 (1) from enteric fever, 7 (1) from measles, 9 (2) from scarlet fever, 15 (1) from whooping-cough, 35 (6) from diphtheria, 67 (20) from diarrhœa and enteritis under two years, and 27 (7) from influenza. The figures in parentheses are those for London itself.

The death from enteric fever outside London occurred at Manchester. Three deaths from whooping-cough were reported from Birmingham, 2 from scarlet fever at Bradford, and 7 from diphtheria at Liverpool. The deaths from diarrhœa numbered 8 in Liverpool, 3 each in Willesden and Sunderland.

The number of stillbirths notified during the week was 262 (corresponding to a rate of 39 per 1000 births), including 49 in London.

LONDON MEDICAL SOCIETIES.

SESSION 1930–31.

AT the opening of a new session we are giving for the convenience of our readers the names of President and of hon. secretaries, with the address at which they can be approached.

Royal Society of Medicine:—President: Dr. T. Watts Eden; Hon. Secretaries: Mr. E. K. Martin, F.R.C.S., Dr. George Riddoch. Address: 1, Wimpole-street, W. 1.

Royal Society of Tropical Medicine:—President: Dr. G. Carmichael Low; Hon. Secretaries: Dr. C. M. Wenyon and Dr. N. Hamilton Fairley. Address: 11, Chandos-street, W. 1.

Medical Society of London:—President: Dr. R. A. Young; Hon. Secretaries: Dr. A. Hope Gosse, Mr. W. E. Tanner, M.S. Address: 11, Chandos-street, W. 1.

Hunterian Society:—President: Prof. A. W. Sheen, F.R.C.S.; Hon. Secretaries: Dr. D. C. Norris, Mr. Andrew McAllister, F.R.C.S. Address: 14, City-road, E.C. 1.

Harveian Society:—President: Dr. P. Montague Smith; Hon. Secretaries: Dr. J. A. B. Hammond and Mr. C. P. G. Wakeley, F.R.C.S. Address: 9, Cleveland-gardens, W. 2.

Medico-Legal Society:—President: Lord Riddell; Hon. Secretaries: Mr. Ernest Goddard, Sir Bernard Spilsbury. Address: 11, Chandos-street, W. 1.

Chelsea Clinical Society:—President: Mr. F. J. McCann, F.R.C.S.; Hon. Secretaries: Mr. A. Rugg-Gunn, F.R.C.S., Mr. H. P. Baylis, L.D.S. Address: 19, Harley-street, W. 1.

London Clinical Society:—President: Mr. H. J. Paterson, F.R.C.S.; Hon. Secretary: Dr. Marie Cassidy. Address: 41, Elvaston-place, S.W. 7.

West Kent Medico-Chirurgical Society:—President: Dr. F. Hudson Evans; Hon. Secretary: Dr. C. J. B. Buchan. Address: "Ledard," Baring-road, S.E. 12.

Royal Medico-Psychological Association:—President: Dr. T. Saxty Good; Hon. Secretary: Dr. R. Worth. Address: Springfield Mental Hospital, S.W. 17.

Society of Medical Officers of Health:—President: Prof. Harold Kerr; Exec. Secretary: Mr. G. L. C. Elliston. Address: 1, Upper Montague-street, W.C. 1.

Tuberculosis Association:—President: Prof. S. Lyle Cummins; Hon. Secretary: Dr. G. T. Hebert. Address: St. Thomas's Hospital, S.E. 1.

STOCKTON-ON-TEES ISOLATION HOSPITAL.—An enlargement of this hospital was opened last week. It includes a new pavilion of two wards and 18 beds, and two single-bedded wards; there is, in addition, a block of eight cubicles. The nurses' accommodation has also been improved.

SHEFFIELD CONTRIBUTORY SCHEME.—Notwithstanding trade depression, the income of the Sheffield "Penny-in-the-Pound" scheme last year reached its highest point—£118,189. During the year the scheme was joined by 186 firms employing 2765 persons, and 404 small traders undertook to pay £1 a year to the fund.

CORRESPONDENCE

A MEDICAL SERVICE FOR THE NATION.

To the Editor of THE LANCET.

SIR,—For some time past both the public and the medical profession have been greatly exercised in their minds about the evolution of the medical service of the nation. War experience brought doctors into closer and more human contact with the public as a whole, and the public, not only through those who suffered in their health directly through the war, but also through the auxiliary services which worked so successfully in assisting the profession, gained an inside knowledge of medical practice. Yet another reason for the growing public interest in medical practice is the steady advance in the science and practice of medicine, including prophylaxis and therapeusis in the widest sense, as a result of which medicine has far more to offer for the sick than it had some years ago, and there is every reason to believe that the growth of medical knowledge will advance even more rapidly in the future. Now in its great effort to recover itself from the strain and losses of the war the nation is taking stock of its resources, and of these the most important is its human material. We who belong to the medical profession must take a forward place in promoting the health and well-being of the people, because on it and national character our ultimate recovery depends.

There are many people who think that the institution of a State medical service is the best means to this end, and many others, who fear this prospect, think it is ultimately bound to come. When one realises the immense control of medical service by the State which has resulted from the National Health Insurance Acts, the creation of the Ministry of Health, and the passage of the Local Government Act, 1929, it is evident that there is some reason for this anticipation and fear.

The great objection to a State medical service is that, while it may improve the average practice of medicine, it will reduce the level of the best, and to a large extent do away with the great ideal of personal service. Those who have served the State in any capacity know well that the individual is sacrificed to the State, whereas in the private practice of medicine everything is sacrified to secure the recovery of the sick person. An alternative means of securing a more efficient medical service for the nation is by the extension of the present Insurance Acts to include dependants of present insured persons, and at a later date a further extension to include persons with a higher income than at present come within the Insurance Acts. The British Medical Association supports this development of medical service, and has published its proposals for a general scheme. In regard to these proposals, I believe that there are serious objections to the extension of insurance practice, because—

(*a*) It will destroy the personal relation between the doctor and his patient, and the patient will lose the personal interest and friendship of his doctor. He will lose his doctor's interest because he will not pay his doctor a fee for his actual professional work, and he will lose his doctor's friendship because in paying him nothing he will feel under an obligation to his doctor for much of his professional service, instead of gratitude for the service rendered in excess of the fee paid for it.

(*b*) Another objection is that, taken as a whole, in spite of the fact that the roll of panel doctors includes the best men in the profession, panel practice cannot be carried on at a sufficiently good standard for reasons that are too well known to the profession to require enumeration here. If the number of panel patients, therefore, is increased, it will inevitably increase the practice of inefficient medicine.

(*c*) Further, it will place an intolerable burden on panel doctors by increasing the number of discretional night calls, frivolous calls, and the unjustifiable demands for medical certificates, all of which abuses are difficult to control even at present.

The B.M.A. proposes to create home hospitals into which doctors can follow their patients, and I believe that this is impracticable. Some doctors want to do hospital work, but I believe that the majority have neither the aptitude for institutional work nor the desire for it. At present there is often difficulty in securing the services of the best local practitioners for the honorary consulting staff of voluntary hospitals, and though one of the reasons for this lack of interest in hospital service is the fact that it is hardly paid, yet neither in the future would extra fees be gained if doctors had the opportunity to follow their panel patients into home hospitals. Lastly, the B.M.A. proposals are financially unsound. However unpalatable the truth may be, it must be realised that a large proportion of the nation are not economically worth private doctoring. They are morally, physically, and mentally inferior people, and their doctoring must be done on a cheaper scale than that of providing each with a private (panel) doctor. If the nation is to provide a private doctor for everyone, the efficients (the average and superior people) will be strangled economically.

In speaking thus of average and superior people, I recognise, as any doctor does, that there is in this no class distinction. We who have the care of people in their greatest emergencies and stress know well that the finest and strongest character is found in all classes of society, and a future Prime Minister of England may be the son of a working man whom his doctor knows as one of the average or superior sort.

There remains a third line along which the medical service of the nation may develop. It is assumed, in the first place, that the best doctoring is provided by a patient's private doctor who is paid for his work. Therefore all those who can afford such doctoring would be allowed to enjoy it, and they would pay their doctor from their own funds or out of insurance funds to which they had made proper contribution. In the second place, all those who cannot pay their doctors' fees would be a charge on the State. For minor ailments they would attend voluntary or municipal hospitals, and if not fit to attend an out-patient department it would be an obligation on the State to send an ambulance to the patient's house, and by law incumbent on that patient to go to the nearest municipal hospital for in-patient treatment.

It seems to me that this third suggestion for the development of medical service is more economically sound and in better keeping with the ideals of the medical profession, as well as to the best advantage of the nation as a whole, than either of the other two schemes. At the same time it leaves with the municipal hospitals the burden of providing medical service for the poor on wholesale lines at the level which their health is economically worth, and it allows scope both for voluntary hospitals and general practitioners to practise their charity for the relief of the sick poor, which has always been one of the highest ideals of medical service. It is, indeed, on the provision of this charitable service that the financial sinews of the voluntary hospital ultimately depend. I believe

it is good for national character to have this opportunity for doing charitable work, and this opportunity would be lost in the creation of a State medical service. I am, Sir, yours faithfully,

London, N.W., Oct. 9th, 1930. GEOFFREY EVANS.

ACHYLIA GASTRICA AND PERNICIOUS ANÆMIA.

To the Editor of THE LANCET.

SIR,—Two cases, reports of which will appear in the October number of the Guy's Hospital Reports, indicate that free hydrochloric acid itself is of more importance in preventing the development of Addison's anæmia and subacute combined degeneration of the spinal cord than would appear from the important investigations of Castle and his colleagues referred to in your annotation of Oct. 11th (p. 809). A gastro-jejunostomy was performed on a man with a gastric ulcer and a normal curve of acidity. His digestive symptoms disappeared, but two years later he developed typical Addison's anæmia with early subacute combined degeneration of the cord and Hunterian glossitis, apparently as a result of the achlorhydria which was now present owing to the complete neutralisation of the free acid in his stomach by the alkaline duodenal juices entering through the stoma.

In the second case (the third of the kind I have seen) treatment of the gastritis, which I thought was the cause of his achlorhydria, led to the reappearance of free acid in the gastric contents of a man with severe Addison's anæmia. Here again the only gastric factor concerned in the development of the disease appears to have been the absence of free hydrochloric acid.—I am, Sir, yours faithfully,

ARTHUR F. HURST.

New Lodge Clinic, Oct. 13th, 1930.

THE ALKALOIDS OF ERGOT

To the Editor of THE LANCET.

SIR,—The annotation with this title which appeared in THE LANCET of Sept. 20th (p. 652) points to the conclusion that official ergot of rye contains no ergotamine whatever, and that, consequently, this substance cannot be regarded as the true active principle of official ergot of rye. I am under the necessity of correcting these erroneous conclusions, which are based on a paper by S. Smith and G. M. Timmis,[1] and, equally, I must refute any suggestion that ergotamine, which has been used for many years in the manufacture of Femergin (Gynergen) preparations, is not produced exclusively from ergot of rye.

As far back as 1923, in a paper communicated to *Die Naturwissenschaften*,[2] I emphasised the fact that ergotamine does not exist in all commercial specimens of ergot, and, in addition, that the content of ergotoxine also varies enormously, depending on either the age or source of the drug. In this paper I especially pointed out that there are several specimens of commercial ergot which contain no ergotamine at all, and that ergot had been investigated "which, although it still contained traces of ergotoxine, yielded no ergotamine, whereas from other samples of ergot practically the total amount of crude alkaloids, obtained in a good yield, could be transformed into the beautiful crystals of ergotamine." On this point, therefore, Smith and Timmis's paper presents nothing new.

At first sight it appears incomprehensible that these authors were unable to isolate ergotamine from official ergot, but reflection suggests the question whether this failure was not due, at least in part, to the method of isolation; this, notwithstanding the fact that Smith and Timmis do not attach any importance to Stoll's "protective" methods of extraction. Since Smith and Timmis do not give any figures stating the yield of crystalline alkaloids, it is impossible to form an opinion as to the efficiency of their method of isolation from a quantitative point of view. Comparative chemical methods will be discussed in another and more appropriate place, and, at present, I would only mention that Smith and Timmis by their method obtain not only ergotamine, but also its transformation product ergotaminine. This proves that their method does not sufficiently take care of the sensitivity of ergotamine. By the "protection" method ergotamine only and no ergotaminine is obtained from fresh ergot. The transformation of the primary alkaloid ergotamine into ergotaminine, which latter substance is very difficultly soluble, and, consequently, also very difficult to isolate, may occasionally lead to the mistaken conclusion that ergot contains no, or very little, ergotamine.

It has never been stated, to my knowledge, that ergotamine, the properties of which are now so well known, can be obtained by one method only. It is, however, an indisputable fact that its first isolation in a pure state was effected by Stoll's "protective" method, and that that method still furnishes the best yield obtainable and the purest product. This conclusion represents the result of my ten years' experience obtained in the manufacture of ergotamine on a technical commercial scale. It is, of course, quite possible that Smith and Timmis did not have any official ergot rich in ergotamine at their disposal. On the other hand, A. W. Forst[3] has isolated ergotamine alongside ergotoxine from official ergot, while we ourselves have frequently succeeded in obtaining ergotamine in a considerable yield, and in some cases alongside ergotoxine from the varieties examined by Smith and Timmis—i.e., Portuguese, Czecho-Slovakian, and Hungarian[4] ergots.

The most definite proof of the fact that ergotamine exists in official ergot is provided by practical experience on a very large scale. During the past ten years the Sandoz Chemical Works, Basle, have extracted ergotamine, by the pound, from many tons of official ergot of rye by the "protective" method, and the ergotamine tartrate thus obtained has been, and still is, used in the preparation of Femergin and Gynergen products. No variety of ergot other than ergot of rye has ever been dealt with in the Sandoz Chemical Works.

For nearly ten years ergotamine preparations have been used in an ever-increasing measure, and hundreds of experimental and clinical research workers have shown that ergotamine possesses all the specific properties of official ergot. As yet no such clinical literature exists on ergotoxine. While in 1923 the British Pharmaceutical Codex (p. 412) still denied recognition to ergotoxine as a clinically efficient active principle of ergot, ergotamine already possessed extensive clinical literature, providing evidence to the fact that it was regarded as the active

[1] Jour. Chem. Soc., June, 1930, p. 1390.
[2] Berlin, 1923, p. 705.
[3] Arch. Exp. Path. Pharm., 1926, cxiv., 132.
[4] One kilo of ergot of rye collected by Prof. Issekutz in the neighbourhood of Sceged (Hungary) in 1928 yielded in my laboratory 0·5 g. pure crystals of the ergotamine (acetone water).

specific principle of ergot. If, in the meantime, investigators, notably Dale and Spiro, have produced evidence that ergotoxine and ergotamine are pharmacologically alike, although they are chemically different, this is no reason for degrading the importance of ergotamine as the active principle of official ergot of rye.

The view that ergotoxine-ergotinine on the one hand, and ergotamine-ergotaminine on the other hand, are different chemical substances has been maintained by me since shortly after ergotamine was first isolated, and I have frequently and consistently supported this view by publishing comparative tables on the properties of both alkaloid groups.[5] Owing to the pharmacological identity of ergotoxine and ergotamine the chemical difference of the two substances has occasionally been questioned, and this doubt received consideration in Smith and Timmis's paper. These investigators, as a result of their experimental research work, have now come to the important conclusion that the two alkaloidal groups are, indeed, chemically different. I would add that a series of analyses recently carried out in our laboratories, under exactly the same conditions for the alkaloids of both groups, confirms the difference in chemical composition, as published by me at an earlier date. The analyses of C, H, and N, executed under special precautionary measures and with the greatest care, and on which I will report in another paper, confirm the formulæ of $C_{35}H_{39}O_5N_5$ for ergotinine and of $C_{33}H_{35}O_5N_5$ for ergotamine and ergotaminine.

I conclude: 1. Ergotamine exists in official ergot of rye, and has been produced on a manufacturing scale for the past ten years, exclusively from ergot of rye, for the manufacture of Femergin (Gynergen) preparations. 2. During this period extensive experimental and clinical literature has provided conclusive evidence that ergotamine possesses all the specific properties of the active principle of ergot. 3. It has once again been confirmed that ergotoxine and ergotamine, and their corresponding transformation products ergotinine and ergotaminine, although possessing identical pharmacological action, are chemically different substances.

I am, Sir, yours faithfully,

Basle, Oct. 8th, 1930. Prof. ARTHUR STOLL.

LORD MOYNIHAN'S ADDRESS AT TORONTO.

To the Editor of THE LANCET.

SIR,—No article that has appeared in THE LANCET in recent years preaches a more necessary gospel than that expounded by Lord Moynihan in his wonderful address delivered at Toronto. It is the business of those engaged in medicine, surgery, and the allied sciences to work together, and clinical observation, the Hippocratic method, must precede, accompany, and follow every stage in our work. There is a passage in your leading article (p. 806) which suggests that the writer has not fully appreciated the value of Lord Moynihan's message; this runs "for surgery to tell physiology what it ought to be interested in is as futile as for a physiologist to attempt to guide the surgeon." Surely it is not futile but most necessary for both physicians and surgeons to tell physiologists the problems that require elucidation, otherwise the physiologist, who has little or no clinical experience, will not know how his labours may advance our knowledge in most essential directions. I am certain that physicians and surgeons are only too eager to have the guidance of the physiologists.

The attitude of mind shown in your leading article is that which has so delayed the progress of medicine in recent years. I hope that physiologists will realise that the great mass of our profession is behind Lord Moynihan in the hope he expresses when he says "We can surely do better in the future by bringing the labourers in the various fields of medicine more closely together." With closer and more intimate collaboration by physicians, surgeons, physiologists, pathologists, and all other workers in our profession, we should certainly present a stronger and more united front to attack, and ultimately conquer the ravages of the many baffling diseases which confront us.

I am, Sir, yours faithfully,

Bradford, Oct. 12th, 1930. WILLIAM H. THOMPSON.

[5] Die Naturwissenschaften (p. 704), Berlin, 1923; and Verhandlungen Deutsch. Pharmak. Ges. (p .111), Leipzig, 1928.

LAXATIVES AND COLITIS.

To the Editor of THE LANCET.

SIR,—It is easy to sympathise with the difficulties Dr. Green expresses regarding laxatives and colitis. I shall try to reply briefly to his points. Instead of paraffin producing wasting (if there is wasting, it is, I fear, often due to other causes) it almost invariably happens that a patient with an unhealthy bowel gains weight when put on paraffin. I have never experienced retardation of digestion through the use of paraffin, quite the opposite in fact, many digestive disturbances vanishing under its use. If it produces digestive disturbance I submit it is being wrongly given; paraffin must be given not less than half an hour *before* food. I have seen many bottles labelled "to be taken after food." This is asking for trouble. If taken an hour before all the better.

The second point is that paraffin must be assisted and harmlessly assisted. It has no "kick" in itself; and to my way of thinking that assistance should come through the use of a physiological laxative, a laxative that does not act through sheer intestinal irritation. The best laxative of this sort I have come across is the now well-known French preparation called Taxol pills; the formula is on each bottle. Of enormous help, of course—though not in itself enough, as Dr. Green says, for the cure of constipation—is a correct diet, that is, one containing plenty of "roughage"; doing a few special abdominal exercises every morning, the Hornibrook system being the most effective; the drinking of as much fluid as possible, and regular ordinary exercise. The grossly sagging abdomen should be supported by a suitable belt.

As nearly all these unhealthy colons exhibit spasm in greater or lesser degree—and at times the degree is very great—the giving of from 7 to 10 minims of tincture of belladonna after breakfast and dinner enormously facilitates the onward passage of the contents of the colon. In nervy subjects—and the colitic individual frequently is nervy—10 grains of sodium bromide given with the belladonna has a sedative and useful effect—and on the colon too, apparently.

As regards seepage; for the relief of this horrible condition I have long since given up the use of paraffin by itself, using instead a combination of 75 per cent. pure Russian oil, along with 25 per cent. of Kaylene, the palatable emulsion resulting being known as Kaylene-Ol. With this preparation seepage is rare; if it does occur more Kaylene can be used. Kaylene is the most effective adsorbent of intestinal poisons I know of, and sufficient can be given to prevent

seepage. In rare cases—and they are very rare in my experience—seepage will occur in spite of everything. Apart from seepage, in some 20 years I have come across only three or four genuine cases of patients really unable to take paraffin. With this type the form of emulsion mentioned will often get over the difficulty.

The audible gurglings, rumblings, and tenesmus mentioned by Dr. Green as being produced by the use of paraffin, can be easily got over by simultaneously employing the taxol pills and the belladonna. The taxols must be regulated to suit the individual patient—one, two, or three a day generally being enough to get two good actions daily, stopping short, of course, of all purging. It is in the combination of these three preparations that the virture and the excellent results got lie. If Dr. Green cares to try the combination I think, in his own words, he will find it of a harmless nature and yet efficient and confidence-giving.

I am, Sir, yours faithfully,

A. GRAHAM-STEWART.

Ulster-place, Upper Harley-street, N.W., Oct. 12th, 1930.

A DANGEROUS PHANTASY.

To the Editor of THE LANCET.

SIR,—Your annotation last week on the subject of my letter concerning the youth with homicidal phantasies brings out very clearly the defects in our legal procedure. It will be a matter for serious reflection to most people, I imagine, when they learn, as you point out, that there is no regular machinery by which mental abnormalities in an accused person can be brought to the notice of the court; and, secondly, that even if an examination were carried out and suspected disorder of mind brought to light, the court would be embarrassed by the difficulties of disposal and treatment. These facts constitute in themselves a sufficient indictment. It is, consequently, hardly necessary to draw attention to the further development in the case in question. From reports in the papers I see that the youth is again in the hands of the police, this time for setting fire to the training ship of which he was a member of the crew.

I am, Sir, yours faithfully,

FREDERICK DILLON.

Wimpole-street, W., Oct. 10th, 1930.

PRURITUS ANI ET VULVÆ.

To the Editor of THE LANCET.

SIR,—Mr. Lockhart-Mummery says he has read with interest the communication by Dr. Knuthsen and myself upon this subject, and feels strongly that our advocacy of X rays must be challenged. His vigorous challenge appeared when I was abroad, and has only just come to my notice. Dr. John McGinn has already replied to Mr. Lockhart-Mummery's condemnation of our views, but as I was responsible for the criticised section of the article I hope I may be allowed a few lines in reply.

1. Like Dr. McGinn I have treated many cases of pruritus ani et vulvæ with success and without any sign of cancer occurring from the treatment.

2. Mr. Lockhart-Mummery has a high and deservedly high reputation for surgical skill in the region under discussion, and had he given a surgical opinion I should have accepted it, but he cannot have had the training to make him a judge as to who is "thoroughly expert in the use of rays."

3. It would be a matter of interest to know what is the evidence for his assertion that there is "a special liability for the skin in the neighbourhood of the anus to undergo X ray burning in certain persons."

Surely the accepted view is that X rays have a special action on elementary embryonic tissue. Of course, the anal region is predisposed to malignant disease, but this is very different from X rays having a special action on it.

I am, Sir, yours faithfully,

London, Oct. 10th, 1930. F. HOWARD HUMPHRIS.

MARRIAGE OF DEFECTIVES.

To the Editor of THE LANCET.

SIR,—Much attention has been drawn in the press to the recommendation of the Board of Control put forward in its report for 1929 that the marriage of defectives should be prohibited by law. The object of prohibiting by law the marriage of defectives is to prevent their procreation. This end, however, can be realised (1) more effectively, (2) more humanely, and (3) less dangerously by making the marriage of defectives conditional on their sterilisation before marriage.

(1) *Effectiveness.*—It is well known that certain high-grade defectives are very fertile and have many illegitimate children. One of the acknowledged objects of marriage specified in the marriage service and applicable to normal people is that it acts as a deterrent from promiscuity. Why should not this also apply to defectives? If defectives are legally prohibited from marrying, the incentive to promiscuity will be increased and illegitimate children will be born. The measure will thus be ineffective in that it will promote illegitimate procreation by defectives.

(2) *Humanity.*—Many high-grade defectives have strong sexual needs. To deprive such persons of the right to express these needs in lawful marriage is hardly humane. Moreover, it is hardly in the interests of children to be born illegitimately by defectives.

(3) *Social Danger.*—Much is made by the opponents of sterilisation of the argument that the measure would result in the dissemination of venereal disease. But many who in one breath condemn sterilisation on these grounds in the next breath advocate the prevention of marriage of defectives as a means of limiting their fertility. Such persons are apparently unaware of the inconsistency between these two arguments. The increase in promiscuity which would follow from preventing the marriage of all defectives would clearly be accompanied by a dissemination of venereal disease. In this sense, the prevention of marriage of defectives would be socially dangerous.

We are, Sir, yours faithfully,

R. LANGDON-DOWN,
J. A. RYLE,
C. P. BLACKER.

London, Oct. 13th, 1930.

BENZYL-CINNAMATE.

To the Editor of THE LANCET.

SIR,—In reply to Dr. Jacobson we wish to say that, in our note on benzyl-cinnamate to which he refers, we had no intention of contesting the pioneer work done by him and others, being under the impression that it was widely known that he was the originator of this form of treatment. We did not give a history of the subject because we did not deem it necesary in so short an article dealing with the results of our cases.

We are, Sir, yours faithfully,

T. W. WADSWORTH.
J. T. FLANAGAN.

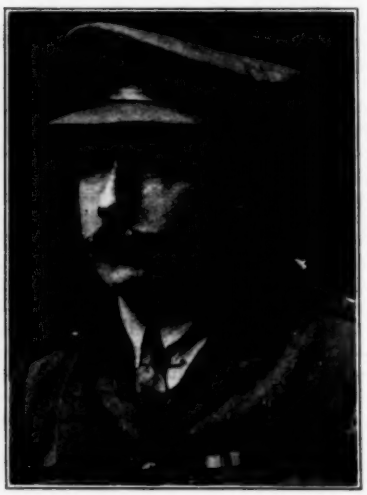
Liverpool, Oct. 11th, 1930.

OBITUARY

THOMAS PERCY LEGG, C.M.G., M.S. Lond., F.R.C.S. Eng.

Mr. T. P. Legg, who only returned from his summer holiday on Oct. 3rd, and spent the following Monday and Tuesday examining at the Royal College of Surgeons, was taken ill on the 8th, and died of heart failure at 7 P.M. the same day. He will be mourned in many parts of the world, especially by the past and present students of King's College Hospital.

Mr. Legg was the youngest of the 12 children of the late Mr. H. B. Legg, of Leeds. He was born in 1872 and was educated at the Modern School for Boys at Leeds, obtaining a scholarship to Yorkshire College, which is now incorporated in the University of Leeds. He entered St. Bartholomew's Hospital in 1889, and after qualifying M.R.C.S., L.R.C.P. in 1895, he held the post of house surgeon to Mr. Langton. He took the M.B. Lond. the next year, and the F.R.C.S. in 1897, being appointed Surgical Registrar to King's College Hospital in 1899. He was also made surgical tutor to the hospital, and became a successful and popular teacher. His appointment to the surgical staff of the Royal Free Hospital gave his teaching gifts further scope, and many students who passed through his hands at these institutions remember, with gratitude, the excellent ground-work which he gave them. In 1905 he was awarded the gold medal in surgery at the B.S. Lond. examination, and the next year he obtained the M.S. In 1910 Mr. Legg's appointment as assistant surgeon to King's College Hospital entailed his resignation from the Royal Free Hospital, where he had reached the senior staff and had collaborated with Sir James Berry in the preparation of the work on "Hare Lip and Cleft Palate," which became a classic. About this time Mr. Legg was also responsible, with his colleague, Mr. Arthur Edmunds, for the complete revision of Cheyne and Burghard's "Manual of Surgical Treatment." This task, completed in 1912, was a laborious one, for five big volumes had to be studied and brought up to date under the authors' critical and conscientious eyes.



MR. T. P. LEGG.

Photo by J. Russell & Sons.

At the outbreak of war Mr. Legg obtained a commission in the R.A.M.C., and worked at the 4th London General Hospital, which was attached to King's College Hospital. In 1915 he was drafted overseas to Mesopotamia, where he acted as consulting surgeon to the Forces in that district, with the rank of Colonel. He returned to London in 1919, having earned the C.M.G. for his services in the East. He was soon absorbed in the reconditioning of King's College Hospital; the army, which had occupied a considerable portion of the hospital, had left it in a chaotic condition, and Mr. Legg set to work, as a member of the Reconstruction Committee, to get the dilapidated wards into good order. At the hospital he was always known to the students as "the little man," and his popularity may be judged by the fact that he was a past president of the Listerian Society and of the Musical Society, and a vice-president of the Rugby Football Club. On Saturday afternoons he was a frequent and a keen spectator at the Rugby football matches. Mr. Legg was attached to several smaller hospitals as consulting surgeon, notably to the Italian Hospital in London, the Florence Nightingale Hospital, the St. Luke's Hospital, the Frimley and Farnham Cottage Hospital, and the Drury Lane Dispensary.

He served as an associate examiner in surgery to the University of London from 1921–23, when he was appointed to the Court of Examiners of the Royal College of Surgeons. He also examined at the University of Cambridge. He had may outside interests. He was the honorary editor of the Transactions of the Medical Society of London, a post which entailed a vast amount of work. He was this year's president of the Clinical Section of the Royal Society of Medicine, a member of the Council of the Surgical Section of that Society, and a past member of the Council of the Harveian Society of London. All these activities demanded time. Mr. Legg often worked until the small hours of the morning.

Mr. Arthur Edmunds writes: "Legg was essentially a lovable man. He never sought a surface popularity or tried to make friends by agreeing with everybody, but by his sincerity and unselfishness won the respect of all those whom he met. Those who knew him as a professional colleague held him in high regard, those who knew him in his private life esteemed him still more. His life was full: private practice, hospital work, organising operating and teaching, the conduct of examinations, and his activities in connexion with professional societies made him a busy man, but he never allowed his work to obsess him. He retained a youthful outlook upon life, and a keen sense of humour, and enjoyed social life among his many friends. He never gave up his interest in sport; like most Yorkshiremen he was, in his young days, a cricketer; and though later he gave up playing cricket and took to golf he retained his interest in the game. He was a regular attendant at the students' games at King's College Hospital, especially at football matches. His professional work was marked by extreme detailed thoroughness, not only in the performance of operations, but in the preliminary examination of his patient, and in their after-treatment. No trouble was too much for him to take, and his personal convenience or even health was never considered when a patient needed him. For any who were in trouble, whether friend or patient, Legg had abundant sympathy, and in his own sorrows and pain he showed fine courage. He read widely, but was never carried away by ephemeral teaching. He weighed new methods and, when he was convinced that a definite improvement had been introduced, adopted it at

once. His teaching was like his work, sound, detailed, and straightforward, and any student who passed through his hands had only himself to blame if he failed to get a thorough grasp of the principles of surgery. We all loved him, and his going leaves us dismayed."

CHARLES B. MAUNSELL, M.B. Dub.,

PAST PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS IN IRELAND.

Mr. Maunsell's sudden death in London on Oct. 7th came as a shock to his friends, few of whom knew that he suffered from any ill-health. He had nearly completed his fifty-eighth year.

Born in Co. Galway, and educated at the High School, Dublin, and Trinity College, Robert Charles Butler Maunsell qualified in medicine and surgery in 1894. He spent a year as house surgeon in Sir Patrick Dun's Hospital, and while still very young was appointed to the visiting staff of Mercer's Hospital as one of the surgeons. In 1900 he was admitted a Fellow of the Royal College of Surgeons in Ireland, and in 1904 was elected a member of the Council of the College. In 1922 he was elected Vice-President, and in 1924 President. During the war he was, for a time, one of the surgeons to the Dublin Castle Red Cross Hospital, and also served as surgical specialist in "83 (Dublin) General Hospital" at Boulogne with the rank of major in the Royal Army Medical Corps. He was consulting surgeon to the Royal Hospital for Incurables, Dublin, and to the Cottage Hospital, Drogheda.

Maunsell's main professorial work was done in connexion with Mercer's Hospital, and the position now enjoyed by that hospital in the Dublin School of Medicine is largely due to his influence and example. At the time of his appointment the hospital had fallen on evil days, and some of Maunsell's friends tried to dissuade him from linking his fortunes with what appeared to be a moribund institution. He had, however, sufficient confidence in himself to believe that he could do good work even under adverse conditions, and within a few years he—with his colleagues—altered the conditions. How good his work was few except those who saw it realised. "Maunsell," writes one of these colleagues, "was a great surgeon. In him diagnostic ability, keen clinical acumen, surpassing skill and technique combined to a degree which placed him in the forefront of surgeons. Withal, his calmness, unruffled under emergency however great, produced a consistency of standard which never varied, whether the task was a minor one or one of great magnitude. His interest in a patient never flagged from the day of admission to hospital until the day of departure. No detail was too insignificant for him, and he never deputed to others the tasks imposed on him by his work. In an age of specialisation, he was equally versed in all branches of surgery."

In public affairs Maunsell seldom took part, for he disliked the limelight though never shirking responsibility. On one occasion it fell to his lot to play a part of considerable importance which has left its mark in Irish medical history. He occupied an important position in the counsels of the Royal College of Surgeons at the moment when the Government of the Irish Free State declared its intention of establishing a medical register for the State. He disliked the change, and expressed his hostility openly, but when he realised that a change was inevitable he set himself to find a solution which would not injure Irish medical education. The plan which the Government ultimately adopted and made law was, in all its main features, drafted by him. Maunsell himself had been, since 1928, a member of the Medical Registration Council thus established.

Of his personal characteristics, the most striking features were unfailing kindness, lack of ostentation, and a native dignity which conferred honour on his profession. To many he appeared aloof, but this was due to a disinclination to indulge in minor conversational commonplaces. Behind his quietness there was a great firmness in regard to just principles. Many men appear to take a more prominent place in the world than did Maunsell, but when they go their places are soon filled. His untimely death has left a vacant place in Dublin surgery.

PANEL AND CONTRACT PRACTICE

A Medical Service for the Nation.

A LETTER from Dr. Geoffrey Evans calls attention in our correspondence columns to the growing public interest in the institution of a State medical service. There are, he says, many people who now believe that a State medical service offers the best opportunities for promoting the health and well-being of the people, while he suggests that the predilection is growing among those who have not realised the existing control of medical practice by the State, and thus have no reason to fear the pressure or over-pressure of bureaucracy. Dr. Evans analyses the difficult position created by the admitted need for the improvement, in the interests of the public and the profession alike, of medical practice as it is to-day carried on; and he finds that the proposed extension of professional service under the National Insurance Acts will have neither of these results. His own proposal to meet the position would imply a real development of the status of the practitioner along independent lines; the view that a State medical service, while perhaps improving the average practice of medicine, would reduce the level of the best, is held by most practitioners—at least as yet. Dr. Evans's essential message is to the whole medical profession that they should observe the growing public bias towards a State service and should realise the severing of intimate relations with patients, as well as the drawback to scientific advance, that such a service may imply.

Ten Years' Work in Scotland.

Miss Muriel Ritson, controller of insurance to the Scottish Department of Health, addressing the Scottish Association of Insurance Committees at Inverness, said the time was opportune for a general stocktaking of our health administration. Ten years ago the Scottish Board's consultative council had reported on the systematised provision of medical and allied services. How far, she asked, had we travelled along the lines of its recommendations? First, there had been a great unification of local machinery. Two bodies and two only now provided health services, the insurance committee and the newly constituted local authority. The old medical service given under the poor-law could henceforth be given by the public health committee of the new authority. Never again would there be the old conflict of interests. In Scotland certain developments had taken place in organising diagnostic

and specialist consulting services, and in increasing out-patient accommodation in hospitals and clinics where such services were obtainable. The hospital services had been to some extent coördinated and enlarged. The number of district nurses had been doubled. Finally, a dental service had been provided for a large part of the insured population; school and pre-school dental clinics had been developed under the local authorities. Some features in the national insurance scheme were equally encouraging. Cash benefits had increased. Additional benefits such as dentistry and ophthalmic treatment had been introduced. The regional medical officer service had come into being and was being slowly extended. The drug bureau was widening its sphere of usefulness. Lastly, the collection of morbidity statistics was pointing the way to the causes of incapacity. Approved societies had loyally shouldered the burden of making the regular returns necessary for compiling these statistics; doctors in their turn would, she hoped, reciprocate by showing readiness to coöperate. Wherein, then, had our provision failed? There are, Miss Ritson said, too many insured persons in cities attending hospital out-patient departments for treatment which ought to be given by their panel doctor; for his part he found difficulty in obtaining from these hospitals the necessary reports and advice. Extravagance in any shape or form must be avoided. Extension of benefits in the past had created a false impression of security; but in fact, every certificate of incapacity issued in the absence of real incapacity drove a nail into the coffin of our hopes of giving a wider service to the genuinely sick. In the results of the new statistical scheme, certain areas and certain practitioners stood out as high certifiers in a quite inexplicable way. These differences between area and area, between practitioner and practitioner, must be explained if the whole financial structure of the service was to be based on the careful and conscientious use of both drugs and certificates.

Reports by Sick Visitors.

Mr. F. A. Goodwin, hon. sec. of the Association of Approved Societies, states in a letter to the *National Insurance Gazette* of Oct. 11th that the proper method of dealing with excessive sickness experience is to provide efficient visitation. For many years his association has endeavoured to obtain for its affiliated societies reports from sick visitors, and he submits that if all groups of approved societies would assist in compiling a register of sick visitors to cover the country completely, so that every person declared sick could be visited within a few days, the first step towards the reduction of claims would have been taken and the societies would be guided in their decisions when to ask help from the regional medical officers. In an editorial note the *Gazette* endorses this suggestion which is regarded as an economical proposition. Should the societies not undertake this duty themselves it is feared that the department may set up a scheme of its own.

Efficient Rural Service.

Mr. P. F. Rowsell, chairman of the Devon Insurance Committee, has replied to Mr. Bevin's allegation that all they got under the panel system was "very casual treatment." As far as Devon was concerned, he said, this was not the case. If there were complaints of casual work, the insurance committee would receive them; they had, in fact, received no complaints of casual treatment. Mr. Bevin's statement was one, he thought, that should be nailed down as incorrect.

Cheshire and Extension to Dependants.

A recent quarterly meeting of the local medical and panel committees for the county of Chester discussed the proposals for a general medical service for the nation and passed a resolution against any extension of the Insurance Acts to the dependants of insured persons. The scheme, said Sir William Hodgson (chairman), would set up a band of specialists when what was wanted was to preserve the right of the general practitioner to undertake for himself every variety of special work for which he is competent Dr. L. J. Picton (secretary) said the object-lesson was the limitation of ophthalmic work to a special panel. If there were to be a similar limitation of other departments of practice the range of a doctor's activities would be very much curtailed. Dr. J. Kerr remarked with concern that younger men were in favour of a systematisation of practice with its limiting conditions but assured income.

Cost of an Extended Service.

Mr. J. Hutton (Redcar), speaking on Oct. 10th from the chair of the annual conference of Health Insurance Committees, expressed approval of the proposals of the British Medical Association for a national medical service. The cost of providing medical benefits for dependants of insured persons had been estimated by the Minister of Health at £10,000,000, and he believed there was no wish on the part of the Association to burden the State with the whole cost. All that was needed, he said, was an extension of the present system of organised medical benefit on a flat rate of payment by increasing slightly the rates of contribution. He pictured an extended medical service so complete as to save educational authorities the expense of examining and treating school-children. Later in the day Mr. A. Cook (Lancashire) put the expense of providing a laboratory service at a farthing a year for each insured person. This was, he said, the experience of the Lancashire Insurance Committee during its four years' experiment which was cut short by Section 4 of the amending Act of 1928. Lord Cozens Hardy had on the previous day suggested that extension of medical benefit could not be ruled out on account of its cost until it was seen whether the State could not be recouped in other directions.

THE SERVICES

ROYAL ARMY MEDICAL CORPS.

Maj. J. D. Bowie retires on retd. pay, and is granted the rank of Lt.-Col.

The undermentioned to be Lts. (on prob.): S. W. Smith and J. M. Officer.

ARMY RESERVE OF OFFICERS.

The undermentioned having attained the age limit of liability to recall, cease to belong to the Res. of Off.: Lt.-Cols. J. H. Robinson and H. G. Pinches.

ROYAL AIR FORCE.

The undermentioned officers are granted permanent commission in the ranks stated: Flight Lieutenants: R. E. Alderson, G. W. Paton, P. B. L. Potter, and S. B. S. Smith. Flying Officer: N. M. Jerram.

Dental Branch.—Flight Lt. (Hon. Squadron Leader) E. A. Wheeler (Temp. Maj., Gen. List, Army, Dental Surgeon) is transferred from the Army to the R.A.F.

RESERVE OF AIR FORCE OFFICERS.

Flight Lt. J. A. Quin relinquishes his commission on account of ill-health.

INDIAN MEDICAL SERVICE.

Lts. R. D. Alexander, S. C. Bakhle, and H. W. Farrell (prov.) to be Capts.

MEDICAL NEWS

Royal College of Surgeons of England.

A quarterly meeting of the Council was held on Oct. 9th, with Lord Moynihan, the President, in the chair. A resolution of condolence was passed on the death of Mr. T. P. Legg, a member of the Court of Examiners.

The Diplomas of Membership were conferred on H. R. Hovsha (King's College), A. H. Lendon (Adelaide), D. K. Mulvany (King's College), and A. L. Devi (Punjab and Royal Free).

The honorary gold medal of the College was presented to Mr. R. Lawford Knaggs. Mr. W. R. Le Fanu was admitted to the office of librarian. Mr. L. J. Honeywill, of Bournemouth School, was admitted as the first Macloghlin scholar. Mr. F. B. Kiernander, of Epsom College, was nominated as the thirty-eighth Jenks scholar.

The President reported that the Thomas Vicary lecture, on Vicary's Predecessors, would be delivered by Prof. G. E. Gask at 5 P.M. on Thursday, Nov. 6th, and that the Bradshaw lecture, on Ocular Muscles, Movements, and Judgments, would be delivered by Mr. J. Herbert Fisher at 5 P.M. on Thursday, Nov. 13th.

University of London.

At examinations recently held at the London School of Hygiene and Tropical Medicine the following candidates were successful:—

ACADEMIC DIPLOMA IN PUBLIC HEALTH.

H. M. P. Bond, A. C. Easterbrook, L. C. Harbans, M. H. James, H. D. Jhingan, W. P. Jones, Donald Magrath, E. A. Straker H. B. Sutherland.

Donald Ross passed only in Part I.

University of Liverpool.

At recent examinations the following candidates were successful:—

DIPLOMA IN PUBLIC HEALTH.

H. R. Dugdale, J. D. A. Gray, R. Krishna, H. S. Lawrence, J. Macdonald, E. S. R. Menon, Nora M. Wilson.

University of Manchester.

At an examination recently held the following candidates were successful:—

DIPLOMA IN PUBLIC HEALTH (*Part II.*)

A. H. Heyworth, Frances A. Hogben, Andrew Meiklejohn.

University of Dublin.

The Montgomery lecture in ophthalmology will be delivered on Thursday, Oct. 30th, at 5 P.M., by Dr. Francis S. Lavery, his subject being Trachoma with special reference to its Sociological Aspect.

University of Oxford.

After holding the Office of Dean of the School of Medicine for over eight years, Dr. E. W. Ainley Walker has resigned from the post. His successor is Dr. M. H. MacKeith, whose official address is at the Department of Medicine, University Museum, Oxford.

Royal Medical Benevolent Fund.

The annual service in aid of this Fund will be held at 3 P.M., on Oct. 19th, at Liverpool Cathedral, when the preacher will be Mr. G. J. Howson. Archdeacon Warrington, the Lord Mayor and Lady Mayoress will attend. Members of the medical profession, and their friends are cordially invited to this service, for which tickets may be obtained from the hon. secretary at 28, Rodney-street, Liverpool.

Royal Faculty of Physicians and Surgeons of Glasgow.

At the monthly meeting of the Faculty, held on Oct. 6th, four Honorary Fellows of Faculty were admitted: Prof. Robert Muir, Dr. W. L. Reid, Lieut.-Colonel L. A. Waddell, I.M.S. (retired), and (*in absentia*) Prof. K. F. Wenckebach, of Vienna. In welcoming Prof. Muir, professor of pathology in the University of Glasgow, the President of Faculty, Dr. John F. Fergus, referred to the large number of Prof. Muir's old students and assistants who had been called on to fill chairs of pathology, not only in this country, but abroad. In admitting Dr. W. L. Reid, the President spoke of the high position he had occupied in obstetrics and gynæcology, in the scientific development of which he had been a pioneer. Of Colonel Waddell, the President noted that in spite of his military, administrative, and academic duties as an officer, as professor of pathology in the Medical College, Calcutta, and as Deputy Sanitary Commissioner, he had found time to make himself a recognised authority in the domains of archæology and ethnology. The President expressed regret that Prof. Wenckebach was unable to be present. His researches into cardiac disorders, notably the irregularities of the heart, had brought him world-wide fame.

Royal Institution of Great Britain.

Among the afternoon lectures to be delivered during November and December are two lectures on New Aspects of Radio-activity, by Mr. C. D. Ellis, F.R.S.; two on the Physiology of Water, by Prof. J. B. S. Haldane; and two on Colour Vision, by Mr. L. C. Martin.

A MEMORIAL tablet to the memory of the late Mr. W. Howard Hazell will be unveiled in St. Bride's Church, Fleet-street, E.C. 4, by the Lord Mayor, Sir William Waterlow, and will be dedicated by the Rev. A. Taylor on Wednesday, Oct. 29th, at 3.30 P.M.

British Institute of Philosophical Studies.

The first evening meeting for the session will be held at the Royal Society of Arts, 18 John-street, Adelphi, London, W.C. 2, on Oct. 14th, at 8.15 P.M., when Sir Percy Nunn will lecture on the Philosophy of Prof. Whitehead.

Guild of St. Luke.

The annual service of this Guild will be held at St. Paul's Cathedral on Oct. 21st, at 8 P.M. Seats will be reserved for medical practitioners and students, who are invited to attend whether or not they are members of the Guild. Those wishing to take part in the procession should robe in the Chapel of St. Michael and St. George. The Guild of St. Luke was founded in 1864 by medical students primarily in order to help them in the special difficulties of a medical student's life. Membership of the Guild is open to students and practitioners of medicine who are communicants of the Church of England. Tickets for the service and further particulars concerning the Guild may be obtained from the Guild secretary, Dr. Andrew Currie, 20, Oxford-terrace, London, W. 2, or from the secretary of the women's ward, Dr. Dorothea Brooks, 65, Park-road, Battersea, London, S.W. 11.

Chadwick Public Lectures.

Three lectures on Rheumatism will be given at the B.M.A. House, Tavistock-square, on Oct. 23rd and 30th and Nov. 6th at 5.15 P.M. respectively by Dr. Francis Bach, Dr. Gerald Slot, and Dr. M. B. Ray; the latter will repeat his lecture at Gateshead Town Hall on Nov. 21st. Other public lectures organised by the Chadwick Trust for this session include one by Mr. J. H. Coste on the Object and Methods of Sewage Treatment, to be given in London on Nov. 14th and at Reading in December. On Nov. 28th, at 5.30 P.M., at the house of the Royal Society of Arts, John-street, Adelphi, W.C. 2, Sir Robert Philip will give the Malcolm Morris memorial lecture on the Outlook on Tuberculosis; Changing Orientation. Further information about these lectures, to which admission is free, may be obtained from the secretary at 204, Abbey House, Westminster, London, S.W.

Medical Sickness Annuity and Life Assurance Society, Limited.

The annual general meeting was held on Oct. 8th at the First Avenue Hotel, Dr. F. C. Martley, the chairman, presiding. He referred to the loss sustained by the society in the death of Dr. Charles Buttar, and said that Dr. G. de Bec Turtle had been appointed to fill the vacancy on the Board. Dr. F. J. Allan retired from the chair after 17 years' service, but was re-elected a director, as was also Dr. W. K. Sibley and Dr. de Bec Turtle. The society had had a successful year in spite of the general financial depression. The practice purchase loans scheme continued to grow, and its success was undoubted. All instalments had been repaid and no bad debts had been incurred. The house purchase scheme had been somewhat revised, and as presented would, he thought, meet the requirements of medical men purchasing their houses through the society. The amount paid in sickness benefit during the year was £1300 less than the previous year, and the premium income had increased by over £6000. The experience was about 67 per cent. of the expectation, which was the same as the previous year. At the last annual meeting the directors, at the request of the members, had agreed to consider the extension of permanent sickness insurance to the age of 70. The actuary had, however, reported adversely on the proposal, and they had felt bound to follow his advice. New life assurance had been completed for £281,000, and the total sums assured had grown from £182,042 in 1922 to £1,368,716, thus showing that the profession was appreciating the advantages given. The sickness and life funds had increased by £64,150, and now stood at £670,635. The total funds of the society were £694,770. The Board had decided to place the staff pension fund under trustees.

National Institute of Industrial Psychology.

Lord D'Abernon has accepted the office of President of the Institute in succession to the late Earl of Balfour, its first president.

Harrow Hospital, Harrow-on-the-Hill.

The new nurses' home, which is called Florence Nightingale House, will be opened by Miss Diana Churchill to-day (Saturday).

Contraception and Allied Questions.

A course of lectures organised by the Royal Institute of Public Health on this subject will be delivered at the Institute, 37, Russell-square, London, W.C., between Oct. 9th and Dec. 11th. Admission is restricted to members of the medical profession and senior medical students. Among the lecturers will be Dr. C. Killick Millard, Dr. C. P. Blacker, Mrs. Marie C. Stopes, D.Sc., Dr. Maude E. Kerslake, Mr. Harold Chapple, and Dr. F. J. McCann.

Alexandra Day Distribution.

At a meeting last week of the Administrative Committee of the Alexandra Day Fund it was reported that the collections in London on Alexandra Day this year amounted to £50,943, to which £4097 was added to from steamship and other contributions. The expenses were £9441, of which £7744 represented the cost of the artificial roses. The committee distributed £40,815 among hospitals, dispensaries, homes and kindred institutions, and carried forward the balance to next year.

Post-graduate Lectures on Cancer.

The Yorkshire Council of the British Empire Cancer campaign has arranged the following lectures for medical practitioners: Sir Almroth Wright, F.R.S., on Medical Research, at the Medical School, Leeds, at 3.30 P.M. on Wednesday next, Oct. 22nd; Prof. Beckwith Whitehouse, on Uterine Hæmorrhage with special reference to Malignant Disease, at the Halifax Infirmary, at 3.30 P.M. on Nov. 26th; Dr. Ronald Canti, showing his Cancer Film, at the Alexandra Picture House, Camp-road, Leeds, on Feb. 4th, 1931, and Mr. Ernest Miles, on the Symptomatology and Treatment of Cancer of the Rectum, at the Royal Infirmary, Huddersfield, on March 5th.

Guild of St. Luke, St. Cosmas, and St. Damian.

The general meeting of this Guild of Roman Catholic doctors and students will be held in the Cathedral Hall, Archbishop's House, on Sunday, Oct. 19th, immediately after the High Mass at Westminster Cathedral, which is celebrated at 10.30 A.M. The annual report of the Council records the activities of the year. The London meetings have been held with regularity and have been fully attended, and regular meetings have also been held in Bath and Bristol, Liverpool, Manchester, Wolverhampton, Glasgow, and Preston. The officers suggested by the Council for 1930 are: Mr. Ernest Ware as master, Mr. Charles Goulden as hon. treasurer, and Dr. W. J. O'Donovan as hon. secretary.

International Society of Orthopædic Surgery.

The first Congress of this Society was held in Paris on Oct. 2nd, 3rd, and 4th, under the presidency of Sir Robert Jones. On the occasion of its foundation in October, 1929, it had been decided that the Society should have a limited membership, ten members only being allotted to the United States, Great Britain, France, Germany, and Italy. At the Congress it was generally felt that the number of representatives from certain of the smaller countries ought to be increased, but on the question of a large expansion of the total membership there were sharp differences of opinion. It was eventually decided to authorise a modest increase in the quota from each country for the next Congress, which is to be held in London three years hence, with Prof. Nové-Josserand, of Lyons, as President. Dr. Murk Jansen, of Leiden, was elected vice-president, in addition to those already holding office—Prof. Gocht, of Berlin, and Prof. Putti, of Bologna. At the opening scientific session on Oct. 3rd Sir Robert Jones gave his presidential address on the Domain of Orthopædic Surgery. This was followed by a discussion on the treatment of congenital dislocation of the hip after the age of 15, the official reporters being Prof. Kreuz, of Berlin; Dr. F. Dickson, of Kansas City (in the absence of Dr. F. Gaenslen, of Milwaukee); Mr. H. A. T. Fairbank, of London, and Prof. Putti. Various members took part, all the five official languages of the Society being spoken. On the next day the subject for discussion was injuries of the wrist-joint, introduced by Dr. Albert Mouchet, of Paris, and Dr. Murk Jansen. Operations were performed on two mornings by Prof. Ombrédanne and Dr. Mathieu. Sir Robert Jones presided at the official banquet on Oct. 2nd at the Union Interalliée, and in the single speech of the evening, despite the difficulties of language, managed to delight the whole company.

Leicestershire Hospitals.

Princess Helena Victoria last week opened extensions of the Melton Mowbray War Memorial Hospital which have cost £17,500. The enlargements include two wards of eight beds each, a new operating theatre and the necessary appurtenances, all on one floor. The men's wards and the private wards are in the original building which now becomes in the main an administrative block. Last week also Sir Edward Packe opened the first instalment of an enlargement of Loughborough Hospital which, when completed, will cost £40,000.

Torquay and District Medical Society.

The opening meeting of the session will be held at the Torbay Hospital on Oct. 16th, at 4.30 P.M., when a paper will be read by Dr. Langdon Brown on the Present Position of Endocrinology. On Nov. 20th Dr. J. Halliwell will deliver his Presidential Address, and other lectures to be given during the session include the following: Dr. R. A. P. Hill on Electrocardiography, Prof. J. M. Woodburn Morison on Treatment of Cancer by Radiations, Mr. J. Howell on the Chief Use of the Peritoneum, Dr. B. Venn Dunn on Dysmenorrhœa, and Mr. E. W. Hey Groves on Art and Nature in the Repair of Fractures.

A Swindon Radio-Clinic.

A clinic for electro-medical and ray therapy was opened last week at Milton-road, Swindon, as an addition to the existing medical and surgical activities of the Great Western Railway Medical Fund Society. The plant has been installed for the time being in a portion of the washing baths specially set apart, but when the maternity home has been transferred to Kingshill, as it soon will be, the clinic will occupy the present home. The idea of the clinic originated with Dr. S. J. C. Mackay; treatment is to be chiefly remedial but prophylactic work may also be undertaken. Patients at present are seen at certain hours, but it is expected that the clinic will become a whole-time institution. It is available for non-members recommended by their own doctors.

British Empire Cancer Campaign.

Sir Charles Gordon-Watson presided at the quarterly meeting of the Grand Council held on Oct. 13th at 12, Grosvenor-crescent, London, S.W. 1. On the recommendation of the Scientific Advisory Committee a further grant of £150 was made to Dr. J. C. Mottram, pathologist at the Radium Institute, London; £300 to Mrs. E. K. Dawson, M.B., of Edinburgh, for the continuance of investigations into mammary cancer, and £250 to Mr. E. Nevill Willmer at the Physiological Laboratory, Cambridge University. An application for affiliation from the Natal Radium and Anti-Cancer Fund, South Africa, was acceded to, thus completing the representation of the British Empire Cancer Campaign in the British dominions. A popular book on cancer had been approved, and will shortly be published by Messrs. John Murray.

Donations and Bequests.

Mr. Hugh Morton, of Moseley, Birmingham, left, among other bequests, £25,000 (exclusive of the share in the residuary estate) to Birmingham University, as to £20,000 to be applied in the discretion of the Council of the University for such special or general purposes as the Council may see fit; £1250 each to the Birmingham and Midland Hospital for Women and the Birmingham General Hospital, for the dedication of beds; and £1000 to the Moseley Hall Convalescent Hospital for Children for a similar purpose. Subject to numerous specific bequests he left the residue of his property as to one-half to the University of Birmingham, to be applied for such general or special purposes, one-fourth to the Birmingham General Hospital, and one-fourth to the Queen's Hospital, Birmingham.—The will of Mrs. Fannie Abrahams, of Westbourne Terrace-road, Paddington, includes bequests of £2000 to the Royal College of Physicians of London for founding a lectureship in physiology in memory of her son, Bertram Louis Abrahams; £1000 to the Westminster Hospital; £2000 to the London Hospital; and £1000 to the East London Hospital for Children for beds in memory of herself, her son, and her daughter.—The Leicester Royal Infirmary will receive £1000 under the will of Miss Annie Elizabeth Clephan, of Regent-road, Southfields, Leicestershire.—Mr. John Herbert Taylor, of Turner's Hill, Sussex, left £6000 in trust for his sister, Laura Worsley Taylor, for life, with remainder in equal shares to Penrith Cottage Hospital and Cumberland Infirmary; £1000 to the London Hospital; and £500 to the East Grinstead Cottage Hospital.—Mrs. Jane Gabriel, of Porchester-terrace, Hyde Park, left £5000 to the Jewish Hospital and Orphan Asylum, and £500 each to St. Mary's Hospital, Paddington, Charing Cross Hospital, Brompton Hospital for Consumption, and the Jewish Home for Incurables.

Westbury Cottage Hospital.

This hospital is being rebuilt at a cost of £10,000, and recently Lady Sybil Phipps laid the foundation-stone. The foundation-stone of the existing hospital was relaid on the new site by Mr. W. H. Laverton, the senior trustee.

Reconstruction of Lytham Hospital.

This institution, which has been entirely rebuilt at a cost of £27,000, was recently reopened by Lord Derby. When the work came to a standstill three years ago for lack of money, the late Mr. E. W. Mellor, the chairman of the hospital, gave £15,000, and his widow has now given a further £1500 to enable the building to be opened free from debt. Provision has been made for 26 patients; in addition, the maternity block will accommodate six patients in the public ward and three in private wards.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, Oct. 21st.—5.30 P.M., GENERAL MEETING OF FELLOWS to fill the vacant post of junior honorary librarian, 8 P.M., PATHOLOGY. Prof. E. H. Kettle: The Relation of Dust to Infection. (Presidential address.)

WEDNESDAY.—5 P.M., COMPARATIVE MEDICINE. Mr. G. H. Wooldridge: Presidential address. Demonstration: Mr. J. G. Wright: Anæsthesia in Small Animals by Intracolonic Administration of Avertin.

THURSDAY.—8.30 P.M., UROLOGY. Mr. S. G. MacDonald: The Results of Partial Resection of the Bladder for Carcinoma. (Presidential address.)

FRIDAY.—5 P.M., DISEASE IN CHILDREN. (Cases at 4.30 P.M.) 8 P.M., EPIDEMIOLOGY. Prof. Major Greenwood: Public Health Education. (Presidential address.)

HUNTERIAN SOCIETY.

MONDAY, Oct. 20th.—7.30 P.M. (at Simpson's Restaurant, 2 and 3, Bird-in-Hand-court, 77, Poultry, Cheapside). First Dinner Meeting. 8.30 P.M., Prof. A. W. Sheen: The School of Health. (Presidential address.)

MEDICO-LEGAL SOCIETY, 11, Chandos-street, Cavendish-square, W.

THURSDAY, Oct. 23rd.—8.30 P.M. (at 11, Chandos-street, Cavendish-square, W.), Dr. Letitia Fairfield: Women Mental Defectives and Crime: a Practical Study. To be followed by a discussion.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

BRITISH EMPIRE CANCER CAMPAIGN POST-GRADUATE LECTURES ON CANCER.

WEDNESDAY, Oct. 22nd.—3.30 P.M. (in the Medical School, Leeds), Sir Almroth Wright: Medical Research.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Oct. 20th, to SATURDAY, Oct. 25th.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Special M.R.C.P. Lecture at 8.30 P.M. as follows: Tues., Dr. L. S. T. Burrell: Bronchiectasis and Abscess of the Lung; Fri., Dr. Donald Hunter: Diseases of Calcium and Phosphorus Metabolism and of the Parathyroids. Mon., 4 P.M., a free lecture by Mr. John Hunter on Recent Advances in Surgery of the Chest.—ST. MARK'S HOSPITAL, City-road, E.C. Tues., 3.30 P.M., free demonstration (ward round) by Mr. L. E. C. Norbury.—EAST LONDON HOSPITAL FOR CHILDREN, Shadwell, E. Wed., 10 A.M., free demonstration (wards) by Dr. Hazel Chodak Gregory.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. Second week of special course in gynæcology.—HOSPITAL FOR TROPICAL DISEASES, 25, Gordon-street, N.W. Third week of special course in Tropical Medicine.—CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road. Third week of special course in Diseases of the Throat, Nose, and Ear.—Further particulars from the Fellowship of Medicine.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, Oct. 20th.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Throat and Ear Clinics. Operations.

FRIDAY.—10.30 A.M.: Ear, Nose, and Throat Clinics. 2.30 to 5 P.M.: Medical, Surgical, and Children's Diseases Clinics. Operations.

NATIONAL HOSPITAL, Queen-square, W.C.

MONDAY, Oct. 20th.—12 noon, Dr. Greenfield: The Neuroglia. 2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Dr. Hinds Howell: Disseminated Sclerosis.

TUESDAY.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Dr. Bernard Hart: Some Aspects of the Psychoneuroses.

WEDNESDAY.—2 P.M., Dr. Purdon Martin: Out-patient Clinic.

THURSDAY.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Dr. Walshe: Multiple Neuritis.

FRIDAY.—2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Sir Percy Sargent: Spinal Injuries.

CHADWICK PUBLIC LECTURES.

THURSDAY, Oct. 23rd.—5.15 P.M. (in the Hastings Hall, B.M.A. House, Tavistock-square, W.C.), Dr. Francis Bach: Rheumatism, Cause and Prevention. (First of three lectures.)

KING'S COLLEGE, Strand, W.C.

THURSDAY, Oct. 23rd.—5 P.M., Mr. J. A. Hewitt, Ph.D., D.Sc.: Metabolism of the Carbohydrates and Fats (second of four free lectures).

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark Hill, S.E.

THURSDAY, Oct. 23rd.—9 P.M., Mr. St. J. D. Buxton: Surgical Aspects of "Backache."

UNIVERSITY COLLEGE, Gower-street, W.C.

MONDAY, Oct. 20th.—5 P.M., Dr. H. P. Gilding: The Reticulo-endothelial System (second of four free lectures).

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, Leicester-square, W.C.

TUESDAY, Oct. 21st.—5 P.M., Dr. W. N. Goldsmith: Anatomy and Physiology of the Skin.

THURSDAY.—5 P.M., Dr. J. M. H. MacLeod: Morphology and Histopathology of Elementary Lesions.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY.

WEDNESDAY, Oct. 22nd.—4.15 P.M. (at St. John's Hospital, 49, Leicester-square), Clinical Cases.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION. St. James' Hospital, Ouseley-road, Balham, S.W.

WEDNESDAY, Oct. 22nd.—9 P.M., Major Stevens: Nepal Film (taken by the Ross Institute Malarial Expedition).

ST. PAUL'S HOSPITAL, Endell-street, W.C.

WEDNESDAY, Oct. 22nd.—4.30 P.M., Mr. W. K. Irwin: The Diagnosis and Treatment of Some Important Bladder Conditions.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.C.

WEDNESDAY, Oct. 22nd.—4 P.M., Prof. W. S. Lazarus-Barlow: Prevention of Pre-Cancerous States and the Arrest of Cancer.

THURSDAY.—4 P.M., Mr. Alfred Goodman: Some Medico-Legal Aspects of Contraception.

GRESHAM COLLEGE, Basinghall-street, E.C.

TUESDAY, Oct. 21st, and the three following days, at 6 P.M., Sir George Newman: Programme of a National Health Service. (Public lectures.)

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.

TUESDAY, Oct. 21st.—4.15 P.M., Dr. C. H. Melland: Pernicious Anæmia: Latest Developments.

FRIDAY.—4.15 P.M., Mr. W. Woods: Tuberculosis: The Veterinary Side.

ANCOATS HOSPITAL, Manchester.

THURSDAY, Oct. 23rd.—11 A.M., Mr. E. E. Hughes: Clinical Demonstration. 4.15 P.M., Dr. W. J. S. Reid: Disorders of the Autonomic Nervous System.

Appointments

DAVIES, H. S., L.R.C.P. Lond., M.R.C.S., has been appointed Resident Anæsthetist to Queen Charlotte's Maternity Hospital.

GORDON, JOHN A., M.B., Ch.B. Aberd., O.P. Medical Officer to the National Hospital for Diseases of the Heart.

STOPFORD-TAYLOR, R., M.B., Ch.B. Liverp., Hon. Dermatologist to the Liverpool Royal Infirmary.

Certifying Surgeons under the Factory and Workshop Acts: BAIRD, W., M.B., Ch.B. Glasg. (Glenluce District, Wigtown); SUTHERLAND, R. K. S., M.B., Ch.B. Edin. (St. Margaret's Hope, Orkney).

Vacancies

For further information refer to the advertisement columns.

Aberdeen Royal Mental Hospital.—Jun. Asst. Phys. £250.
Auckland, New Zealand.—Sen. Asst. Pathologist. £750.
Bedford County Hospital.—H.S. At rate of £175.
Birmingham and Midland Eye Hospital, Church-street.—Asst. S.
Birmingham and Midland Nerve Hospital.—H.P. £70.
Birmingham, Selly Oak Hospital.—Part-time Radiologist. Also Part-time Dental Surgeon.
Birmingham City.—Asst. M.O.H. for Maternity and Child Welfare. £600.
Bradford Royal Infirmary.—H.P. and H.S. Each £150.
Brighton, Royal Sussex County Hospital.—Sen. Asst. Pathologist to Special Depts. £400. Also H.P. £150.
Brighton, Sussex Maternity and Women's Hospital.—Res. H.S. £130.
Burnley County Borough.—M.O.H. £1100.
Burnley, Victoria Hospital.—H.P. At rate of £150.
Bury Infirmary, Lancashire.—Third H.S. At rate of £150.
Cambridge, Addenbrooke's Hospital.—Res. Anæsthetist and Emergency Officer. At rate of £130.
Canterbury, Kent and Canterbury Hospital.—H.P. At rate of £125.
Cardiff Royal Infirmary.—Gynæcological H.S. At rate of £50.
Chester Royal Infirmary.—H.S. £150.
Chester, Wrenbury Hall Tuberculosis Training Colony.—Res. H.P. £250.
Connaught Hospital, Orford-road, E.—Res. H.S. At rate of £100. Also Hon. Visiting Dental Surgeon.
Croydon, Mayday Hospital.—Res. Asst. M.O. £300.
Doncaster Royal Infirmary.—Two Hon. Asst. Surgeons. Also Jun. H.S. At rate of £175.
Dublin, Mercers' Hospital.—Hon. Visiting Surgeon.
Dukinfield Borough and Hollingworth Urban District.—M.O.H. £800.
Evelina Hospital for Sick Children, Southwark, S.E.—H.S. At rate of £120.
French Hospital and Dispensary, 172, Shaftesbury-avenue, W.C.—Asst. Pathologist, part time. £100.
Gloucester, County and City Mental Hospitals.—Laboratory Asst. £260. Also Jun. Asst. M.O. £350.
Gloucester Royal Infirmary and Eye Institution.—Res. Surg. Officer. At rate of £175.
Great Yarmouth General Hospital.—Jun. H.S. At rate of £140.
Hospital for Sick Children, Great Ormond-street, W.C.—Dental Surgeon.
Ipswich, East Suffolk and Ipswich Hospital.—Cas. O. £150.
Liverpool, Royal Babies' Hospital, Woolton.—Res. M.O. At rate of £90.
Liverpool, Royal Children's Hospital, Myrtle-street.—Res. Cas. O. £250.
Llangwyfan, near Denbigh, North Wales Sanatorium.—Third Asst. Res. M.O. £250.
Madras Medical College.—Professor of Pathology. Rs.1100 a month.
Madras Presidency.—Asst. Director of P.H. for Maternity and Child Welfare. Rs.600 a month.
Maidstone, Kent County Ophthalmic and Aural Hospital.—H.S. to Ear, Nose, and Throat Department. At rate of £200.
Maidstone Pembrey Institution.—Asst. M.O. £200.
Macclesfield General Infirmary.—Second H.S. At rate of £150.
Manchester Hospital for Consumption and Diseases of the Throat and Chest.—Res. M.O. for In-patient Dept., Bowdon, Cheshire. £200.
Metropolitan Ear, Nose, and Throat Hospital, Fitzroy-square, W.—H.S. £150.
Newport Mental Hospital, Caerleon, Mon.—Asst. M.O. £400
Nottingham General Hospital.—Res. Cas. O. At rate of £150
Oldham Royal Infirmary.—Two H.S.'s. Each at rate of £175.
Plymouth, City of.—Radium Officer. £1000.
Prince of Wales's General Hospital, London, N.—Hon. Asst. Surg.
Princess Louise Kensington Hospital for Children, St. Quintin-avenue, North Kensington, W.—Hon. Asst. Dental S.
Queen's Hospital for Children, Hackney-road, E.—Res. M.O. £200.
Reading, Blagrave Branch Hospital, Calcot.—H.S. At rate of £150.
Richmond, Surrey, Royal Hospital.—Sen. H.S. At rate of £150.
Royal Eye Hospital, St. George's Circus, Southwark, S.E.—H.S. and Asst. H.S. At rate of £150 and £100 respectively.
Royal Free Hospital and London (R.F.H.) School of Medicine for Women, W.C.—Obstet. and Gynæcological Unit, Sen. Asst., part time. £350. Second Asst. £500. Also Third Asst. £270.
Royal National Orthopædic Hospital, 234, Gt. Portland-street, W. Three Surg. Registrars. Each £105.
St. Benedict's Hospital, Church-lane, Tooting, S.W.—Asst. M.O. £350.
St. Mary's Hospital, W.—Med. Registrar. £200.
St. Pancras Dispensary, 39, Oakley-square, N.W.—Res. M.O. £200.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. At rate of £100.
Sheffield Royal Hospital.—H.S. Also Ophth. H.S. Each at rate of £80.
Southampton, Free Eye Hospital.—Hon. Asst. Ophthal. Surgeon.
South-Eastern Hospital for Children, Sydenham, S.E.—Asst. Res. M.O. At rate of £100.
South London Hospital for Women, South Side, S.W.—Physician to the Skin Dept. Also Anæsthetist. 10*s.* 6*d.* per attendance.
Stockport Infirmary.—H.P. £175.
Swansea Hospital.—H.S. to Ear, Nose, Throat, &c. Depts. At rate of £200.
Walsall General Hospital.—Cas. H.S. At rate of £120.
Walsall, Manor Hospital.—First Asst. Res. M.O. At rate of £200.
Willesden General Hospital, N.W.—Clin. Asst. to Gynæcological Out-patients' Department.
Wolsingham, Holywood Hall Sanatorium.—Asst. M.O. £350.
Workmen's Compensation Act, 1925.—Member of the Medical Board for Silicosis. £750.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Dursley (Gloucestershire) and Ebbw Vale (Monmouthshire).

Births, Marriages, and Deaths

BIRTHS.

CRIPPS.—On Oct. 7th, at a nursing home, Horley, Surrey, the wife of W. Lawrence Cripps, F.R.C.S., of a daughter.

HARDING.—On Oct. 6th, at Lima House, Reading, to Dr. Elisabeth Harding, the wife of W. G. Harding, F.R.S.E.—a daughter.

JENNINGS.—On Oct. 8th, 1930, in London, to Edna (née Moynihan), wife of C. B. Jennings, L.M.S.S.A.—a daughter.

MARRIAGES.

BADO—REISS-SMITH.—On Oct. 9th, at St. Swithin's Church, Southsea, Major Arthur James Bado, Royal Army Medical Corps, to Thora Vivian Reiss-Smith, younger daughter of the late Robert E. and Mrs. Reiss-Smith, of Plymouth.

LODGE—LANKESTER.—On Sept. 20th, in Leicester, R. Lodge, M.B., F.R.C.S. Edin., of 13, De Montfort-street, Leicester, to Kathleen Mary Lankester, M.B., B.S. Lond., elder daughter of Mr. and Mrs. Allen Lankester, of Sandford, Knighton Grange-road, Leicester.

MCCOWAN—RODEN-BAKER.—On Oct. 13th, at Wesleyan Chapel, Wickhambreaux, Alexander Knight McCowan, M.B., Ch.B., to Florence Agnes Roden-Baker, Chartham, Kent.

MCELNEY—DEACON.—On Oct. 9th, at St. Andrew's Cathedral, Singapore, John Harold McElney, M.B., Ch.B. Edin., to Ariel Ransford Stewart Deacon, M.B., Ch.B. Liverp., D.T.M.

DEATHS.

BROWNE.—On Oct. 6th, at a nursing home, Colonel Andrew Lang Browne, late A.M.S., formerly of Kelvedon, Reading, and Taunton, Somerset, in his 82nd year.

BUSH.—On Oct. 7th, at Bristol, Col. James Paul Bush, C.M.G., C.B.E., Ch.M. Bristol, M.R.C.S. Eng., L.S.A., aged 73.

HUNTINGTON.—On Oct. 11th, at his daughter's residence, Hanover-street, Edinburgh, William Huntington, M.R.C.S. Eng., L.R.C.P. Lond., late of St. Andrews, Fife.

LEGG.—On Oct. 8th, suddenly, at Harley-street, W., Thomas Percy Legg, C.M.G., F.R.C.S., M.S.

WILLEY.—On Oct. 1st, 1930, at Farringford, Queen's Park, W. Drive, Bournemouth, Thomas Willey, M.D., aged 84.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

THE LANCET: SUBSCRIPTION RATES.

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	Three Months	0	12 6

For complete scale of advertisement charges apply to THE MANAGER.

NOTES, COMMENTS, AND ABSTRACTS

THE STETHOSCOPE: PAST AND PRESENT.

Presidential Address delivered before the Medical Society of London on Oct. 13th

By R. A. YOUNG, M.D., B.Sc. LOND., F.R.C.P., F.S.A.,
SENIOR PHYSICIAN TO THE MIDDLESEX HOSPITAL; PHYSICIAN TO THE BROMPTON HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST.

A GENERATION has arisen which has not been taught, or has forgotten, the full debt which the practice of medicine owes to Laennec. I have therefore taken the stethoscope as the symbol or sign of clinical medicine, not that I regard it as indispensable, but because I fear that the methodical study of symptoms and physical signs, including the use of the stethoscope, is being relegated to a subordinate position, while laboratory results are too often regarded as oracular and infallible, a claim which the laboratory worker is usually the last to make for them. [1]

The craftsman who works with an instrument, a tool, an apparatus, or a machine is usually at an advantage over one who does not. Any instrument used at its best gives its user the thrill of expertise, the joy of expression and that exaltation which elevate the craftsman into the artist. Prof. Sir Walter Raleigh [2] says: "It is the misfortune of the actor, the singer, and the dancer that their bodies are their sole instruments. . . . The poorest skill of the violinist may exercise itself upon a Stradivarius, but the actor is reduced to fiddle for the term of his natural life upon the face and fingers that he got from his mother."

Such was the fate of the physician till the invention of the stethoscope, the laryngoscope, the ophthalmoscope, and other apparatus for enlarging the fields of observation of his senses. I am convinced that the art and craft of surgery and its usefulness to suffering mankind have been greatly enhanced by the profound study which every successful surgeon gives to technique, to details which save time and labour, and to methods which obviate shock and minimise hæmorrhage, as well as to the devising of special apparatus to achieve these ends.

Criticisms of the Stethoscope.

Some mechanisms of simple type, such as the wheel, the pulley, the lever, and the crowbar seem so fundamental and so essential that it is difficult to conceive of civilised life without them. To such an order in medicine the stethoscope would seem to belong. The times are changing, and this instrument, so long acclaimed as one of the greatest of medical inventions, is now, to judge by recent papers and correspondence in the medical journals, regarded as an almost archaic survival, like the lancet, the bistoury, and the wet-cupping apparatus, though the last-named seems to be achieving a new lease of life on the Continent.

Dr. Gravesen,[3] of Viljefiord, a sanatorium practitioner of great experience, writes: "We may derive help from recent gains in our knowledge which emphasise unequivocally the fact that the earliest beginnings of pulmonary tuberculosis are associated with insignificant and often quite negative stethoscopic signs . . . the stethoscopic examination even when it is carried out with all the finesse which, in the course of time has been devised for its rescue, is an exceedingly imperfect device, which must of necessity be supplemented by serial skiagrams if it is to be a guide to the detailed diagnosis."

Dr. Edward E. Prest [4] refers to "the lack of usefulness of the stethoscope in the diagnosing of pulmonary tuberculosis," but rightly stresses the importance of symptoms. It has even been suggested that in a disease like tuberculosis of the lungs the diagnosis and treatment can be effected and controlled by X ray methods entirely, apart from other physical methods.

Dr. W. Burton Wood [5] has recently written: "Yet the time has come when we must recognise that chest radiology has proved that much of the former teaching was wrong. The X ray tube is a more searching and a far more accurate instrument than Laennec's tube." He further states that: "Thus though we are not yet able to dispense with any diagnostic aids, though a careful clinical investigation must still be the prelude to any investigation, we can look forward with confidence to the day when instruments of precision will dispense with the need for tests largely dependent upon personal factors."

[The lecturer here briefly pointed out the value to clinical procedure of careful inspection, palpation, and percussion, and continued:—]

History of the Stethoscope.

The history of the introduction of the stethoscope as a clinical instrument is one of the most fascinating and stimulating stories in medicine, and is a striking record of the combination of genius and industry. Laennec first used the stethoscope in 1816. He read a paper on its use before the Academy of Sciences in February, 1818, gave lectures before the Academy of Medicine in May, June, and July of that year, and published the first edition of his immortal treatise in August, 1819. Sir William Hale-White,[6] to whose interesting book I am greatly indebted, tells me that the price of Laennec's book was 13 francs or 16 by post, and that of a stethoscope 3 francs.

It is interesting to note in this connexion that among Laennec's many hobbies was an interest in turning. This may account for the form of one of his early stethoscopes, of which the tube consisted of two parts screwed together, with a stopper in the chest end. Laennec's own description of his discovery and of its origin is given in his treatise, paragraph 8. Sir William Hale-White's translation of this dramatic yet artlessly described discovery runs:—

"In 1816 I was consulted by a young woman presenting general symptoms of disease of the heart. Owing to her stoutness little information could be gathered by application of the hand and percussion. The patient's age and sex did not permit me to resort to the kind of examination I have just described—i.e., direct application of the ear to the chest. I recalled a well-known acoustic phenomenon—namely, if you place your ear against one end of a wooden beam the scratch of a pin at the other extremity is most distinctly audible. It occurred to me that this physical property might serve a useful purpose in the case with which I was then dealing. Taking a sheaf of paper I rolled it into a very tight roll, one end of which I placed over the præcordial region, whilst I put my ear to the other. I was both surprised and gratified at being able to hear the beating of the heart with much greater clearness and distinctness than I had ever done before by direct application of my ear."

Certain picturesque details have been added to this account by other writers. It is said that it was on the previous day at the Louvre that the idea was given to him by seeing children using a beam of wood in the manner described.

Dr. Warfield T. Longcope [7] has recently brought to light an interesting account, published by Dr. A. B. Granville [8] in 1854, in a book on Sudden Death. Dr. Granville consulted Laennec as a young man for certain alarming symptoms, apparently regarded as anginal. Laennec reassured him and Granville, impressed by his methods, followed his practice at the Necker Hospital. He gives the following detailed account of what he claims to have witnessed:—

"At length hearing of the great and rising reputation of Dr. Laennec, in the treatment of diseases of the chest, at the Hôpital Necker, in which he had succeeded to the post

of principal physician, on the death of Mongenot, which had taken place in 1815, I obtained admission into that hospital, through the Minister of the Interior, as a student, and for a time followed the professor's practice, waiting to see how his diagnoses were verified by dissections, before I again submitted my own case to the consideration of another French physician.

"It was Laennec's habit, when examining a newly admitted patient, labouring under pectoral disorder, to percute him (as I have seen invariably done in the Clinique of La Charité also) in every part of the chest, both in front and at the back, as well as on either side. After which he would apply the ear to any part which had resounded badly or imperfectly. One day (it was the 13th of September, 1816, for I took note of it) Laennec seemed dissatisfied with the result of his percussion and direct auscultation in an interesting but obscure case before him; when turning around to the circle of pupils around the bed, 'Why,' said he, 'should we not avail ourselves of the help which acoustics yield to us, of making distant sounds more audible? The speaking-trumpet enables the dull of ear to hear the faintest whisper; the ascending tube in a warehouse conveys to the upper stories, in audible sounds, the muttered directions of the master below; the ticking of a watch, placed at the end of a long beam, is heard loudly by the ear applied to the other extremity; a tube, therefore, applied over the lungs or to the chest over the heart, ought to instruct us more plainly through our ears, with the movements and sounds going on within;' and forthwith snatching the *cahier des visites* from the hands of the nearest *élève interne*, and rolling it up lengthwise to the shape of a cylinder, having a perforation through its axis he applied it first to one side of the chest, then to the other, and again to the back, between and below the shoulder-blades, and declared (what we all know to be true) that he could make out with greater distinctness, than with the naked ear applied over the parts, their inward condition, from their respective sounds which he then described.

"Such was the birth of that famous instrument, at first denominated by its inventor *pectoriloque*, which, slowly winning its way from the humble hospital, bearing the name of its founder, the unlucky minister of Louis XVI. to every corner of Europe and to the new world, has laid open to the medical men in almost every instance the scenes of disease enacted within the thorax, which before baffled detection. The invention of the stethoscope, simple and accidental as it may have been, marks a striking era in the history of medicine, and is second only in importance of results to the discovery made by the immortal Harvey.

"On the following day Laennec had procured proper cylinders made of a thick pasteboard (for which he not long after substituted hard wood), 8 in. long, and 1¼ in. in diameter, perfectly smooth, with an even perforation in its centre throughout its axis. It had the two ends somewhat hollowed out, so that the one which was applied to the convex parts of the chest, as well as the opposite end to which the ear of the examiner was applied, fitted admirably for both purposes. Such an instrument as this I brought to England in November, 1817 (that is, a year after its invention), when I first settled myself down in practice in Savile Row; and I well remember how most of my contemporaries, to whom the instrument was exhibited and explained, made themselves merry at the credulity of French doctors and my own."

Dr. Granville adds a footnote with an almost injured tone:—

"Why Laennec, in his first edition of the work in which he announced the invention should have changed the scene of its first application from the ward of the hospital to the chamber of a fair patient, is not very intelligible to me, except on the score of French *gallanterie*. My own notes, taken down at the time and on the spot, are liable to no misconception."

There does not seem to be any real discrepancy. Laennec, flushed with the joy of his discovery of a day or so before, may well have adopted the dramatic method of announcing his discovery to his pupils. I prefer this explanation to that of Dr. Longcope, who writes: "It seems probable, therefore, that his description of the use of the stethoscope by Laennec at the Hôpital Necker is accurate, though the conclusion that he witnessed the invention of the instrument may be an indulgence to his childish (Granville's) vanity." In any case, we know that Dr. Granville was a distinguished and learned man, who kept a diary. The date and the description he gives are consequently of great interest.

Fortunately we can form a very clear impression of Laennec, for not only are there portraits and sketches of him, one of the latter drawn and lithographed by himself, but there are also many descriptions of his appearance and of his personality, written by his enthusiastic pupils and admirers, not a few of them by our own countrymen, who early recognised the importance of his work. Among these may be mentioned Stokes, Hodgkin, C. J. B. Williams, and Gregory, the son of the professor at Edinburgh. Williams [9] made a sketch of him and writes of him as "of fine sharp intelligent features and amiable expression of countenance; and with his extraordinary costume of straight-cut grey frieze coat and embroidered decoration." Laennec was described by Dr. S. G. Goodrich [10] (Peter Parley) as follows: "He was a little man, five feet three inches in height, and thin as a shadow. However, he has acute features and a manner which bespeaks energy and consciousness of power." I must also quote Sir William Hale-White's clear-cut verbal picture, drawn from contemporary sources: "This small, attenuated bony figure of a man with prominent cheek bones, hollow cheeks, thin nose and lips, calm, reflective blue-grey eyes, a long head covered with carelessly combed abundant chestnut hair, who was not handsome, but not ugly, whose face showed much distinction and intelligence." Rudyard Kipling,[11] in his story of "Marklake Witches" in "Rewards and Fairies," gives a sensitive and understanding picture of Laennec. The incident is, however, entirely imaginary, as Laennec never visited England and was certainly not a prisoner of war in this country.

Auscultation before Laennec: Laennec's Personality.

In reference to what was known of sounds associated with normal or abnormal bodily conditions before Laennec's time, the Hippocratic school knew of succussion and the sound of pleural friction, the latter being described as "like the grating or creaking of a leather thong." Araeteus is said to have practised a form of auscultation. Dr. Samuel Gee [12] states that metallic tinkle was described by Willis in 1674, and crepitation in pneumonia by Van Swieten in 1745. Harvey mentions the heart sounds in his "De motu cordis," and a cardiac murmur was described by James Douglas in 1715. Perhaps, however, the most striking observations were those of that great genius, Robert Hooke, who wrote: "I have been able to hear very plainly the beating of a man's heart; and it is common to hear the motion of the wind to and from the guts and other small vessels; the stopping in the lungs is early discovered by the wheezing, the stopping of the head by the humming and whistling noises, the slipping to and fro of the joints in many cases by crackling and the like."

In the three years or less between the first use of his stethoscope and the publication of the first edition of his book, Laennec accomplished an almost incredible amount of work, describing the sounds heard in the lungs in normal and abnormal conditions, so completely and so accurately that little has been added since and still less been modified. Not only so, but he established and verified the significance of the sounds heard by most careful study in the post-mortem room. By these means he established the nature of phthisis as tuberculous, and greatly increased our knowledge of other diseases of the lungs, including pulmonary œdema, gangrene, emphysema, bronchiectasis, hydrothorax, and pneumothorax, some of which he actually first recognised. A mere enumeration of some of the terms introduced into medicine by Laennec will serve to show his great industry. They include: auscultation, stethoscope, râles, fremitus (fremissement), cracked pot sound, metallic tinkling (tintement metallique), bronchophony, ægophony, cavernous breathing, puerile breathing, vocal resonance, veiled puff, and bruit. He also recognised the bell sound, afterwards called the *bruit d'airain* by Trousseau.

His work on the heart sounds was noteworthy, though less exhaustive and less completely accurate. He recognised murmurs and described a *bruit de râpe*

and a *bruit de soufflet*, both of these terms being admirably descriptive.

It is not surprising after this great achievement that his health broke down, and that he had to go to his native Brittany in 1819 to recuperate after the completion of his book, but before its publication. He soon recovered and returned to work, to break down again more seriously next year, no doubt from the effects of pulmonary tuberculosis. He returned to his beloved Brittany, this time for a stay of two years, during which he indulged in his favourite outdoor pastimes. He desired to excel in shooting, hunting, and riding, and was modest about his great scientific achievements. He played the flute, and worked at turning with his lathe. He then returned to Paris in 1821, to work harder than ever. Pariset writes: "He was but a breath of air and thought himself a Hercules." In addition to his practice, which became large, and to his official duties, he extended his researches and re-wrote and altered his book. This was completed just as he left Paris. At this time he recognised that he was dying, and he knew the nature of his own complaint. His urgent desire was to return to Brittany. He left Paris on May 30th, 1826, reached his home at Kelouarnec (The Place of the Foxes) after a tedious and uncomfortable journey, involving much suffering. He died on August 13th of the same year, at the early age of forty-five and a half years.

More Criticism: the Stethoscope in Popular Literature.

It was natural that so new and revolutionary a discovery should excite opposition, which often took the form of ridicule. His chief opponent in France was the self-opinionated and pugnacious F. J. V. Broussais. Of Dr. H. J. Cholmely it is recorded in a history of Guy's Hospital[13]: "Like most of his contemporaries, he despised the stethoscope and would have nothing to do with the new-fangled innovation. Surprise, therefore, was in everyone's countenance when he one day came into the hospital flourishing a stethoscope; he said he had bought one of the fashionable instruments, and proceeding to the ward placed it on the table, at the same time inserting a flower into the top of it, and exclaiming, 'What a capital bouquet holder.' On leaving, he took it up and repeated the process in the next ward." The *Observer* recently quoted[14] from its old files of April, 1830, a jibe at the stethoscope. Referring to metallic tinkle, the most likely source of this sign was described as from "two pieces of coin which found their way into the palm of the doctor." Oliver Wendell Holmes made gentle fun in his doggerel. "Stethoscope Song." You may remember that two flies get entangled in a spider's web within the stethoscope. I may quote a few lines:—

> "Now when the stethoscope came out
> The flies began to buzz and whiz.
> Oh ho! the matter is clear no doubt,
> An aneurysm there plainly is
> The bruit de râpe and the bruit de scie,
> And the bruit de diable are all combined."

The kind young doctor listens to six young damsels slight and frail—

> "So fast their little hearts did bound,
> The frightened insects buzzed the more,
> So over their chests he found
> The râle sifflant and the râle sonore."

An incident recorded by C. J. B. Williams perhaps best illustrates the way in which the stethoscope was at first regarded. He was appointed travelling physician to a gentleman. At the consultation at which he was introduced, he deprecatingly asked the physician in charge if the chest of the patient had been examined with the stethoscope. The reply was in the negative, "with as much contempt of manner as politeness would allow." Most of us are probably familiar with that type of man, and can recognise that manner, so devastating in its assumed contemptuous superiority.

The Introduction of the Stethoscope and its Modification.

The value of the stethoscope achieved early recognition in this country, and there can be little doubt that this fact was appreciated by Laennec, for he seems to have welcomed his English pupils and to have had a real affection for some of them. His book was translated into English by Sir John Forbes[15] in 1821. Sir Charles Scudamore wrote of Laennec's method in 1826. C. J. B. Williams, an enthusiastic admirer of Laennec, wrote and lectured about his work and helped to popularise the stethoscope. The Dublin school, with its brilliant group of Stokes, Graves, and Corrigan, adopted and extended Laennec's work. Stokes[16] published an "Introduction to the use of the Stethoscope" in 1825. It is charmingly written and is a notable contribution to the subject. The stethoscope was at that time more generally employed in this country than in that of its origin, and this seems to be equally true to-day.

There is some competition for the honour of the first introduction of the stethoscope into this country. Sir Benjamin Ward Richardson,[17] who devoted much attention to the stethoscope and its history, at first accorded the credit to Dr. Granville, F.R.S., to whom I have already referred. He was editor of the *London Medical and Physical Journal*, in which a description of the stethoscope appears in the issue of Jan. 25th, 1820. The late Sir F. Seymour Haden, the surgeon and master etcher, claimed priority for his father, Dr. C. T. Haden, of Derby. He stated that Dr. Haden, who died at the early age of 38, "was an early believer in the discoveries of Laennec, and worked with him at the lathe at which he made his first instruments for auscultation." No dates were given, so it is difficult to decide between these rival claims.

The primitive stethoscope was, as we all know, a roll of paper. The next form was probably the simple straight tube, with a central bore and a funnel-shaped stopper at the chest end, of which I am fortunate enough to possess a specimen. It is 27 cm. long, 4 cm. in diameter, and has a bore of 1 cm. Such are called the first edition stethoscopes or sometimes the *bâton de maréchale*. Laennec at first called his instrument the bâton, cylinder, or pectoriloque, and eventually gave it the euphonious name of stethoscope. The next form seems to have been divided into two parts in the middle, fitting into one another or screwed together. I have here a specimen kindly lent me by Dr. Michael Foster. Other modifications soon occurred. One of the earliest was the hollowing out of the end applied to the ear. C. J. B. Williams tells the story of Sir Charles Scudamore, who when visiting Laennec was unable to hear with the stethoscope owing to the large size of his tragus, but appreciated its value when the aural end was hollowed out. It soon took the abbreviated or third edition form, of which I have here two examples. They were shorter, but still 2½–3 cm. thick, but with a stopper at the chest end and a definite ear piece. This was probably the form in which it was first available in this country, apart from a few actually presented by Laennec to his pupils. Sir B. W. Richardson says it was imported from Paris in 1820 by Trentell and Wurtz, booksellers at Soho-square, at a price of 2 francs, which is less than the price originally charged in Paris. He adds that when the supply was not equal to the demand, the instruments were made by a wood-turner named Allnutt, who lived in Piccadilly. Piorry[18] made the great change of reducing the stem of the instrument to the size of the little finger, thus giving the wooden stethoscope an approximation to its present form. His book with a plate showing its form and his pleximeter was published in 1828. The next advance was the flexible stethoscope. There seems little doubt that the credit for this must be accorded to Dr. N. P. Comins,[19] who described in 1828–29 a flexible stethoscope as a substitute for what he calls the "timber cylinder." He also suggests that it can be made so that both

ears can be used, which must be the first suggestion of a binaural stethoscope. He claimed that "as it does not require the head of the stethoscopist to be over the chest of the sick person, and as another tube can be screwed to the instrument so as to lengthen it, it can be used in the highest ranks of society without offending fastidious delicacy." He also mentions that it can be lengthened to avoid too close proximity to contagious cases and the miserably wretched. In this connexion I may mention that Dr. Graham Steell, at Manchester, used a very long wooden stethoscope, as also did Murchison. It is presumed that the length was based upon the jumping records of the flea. Dr. Golding-Bird,[20] at Guy's Hospital, also employed a monaural flexible stethoscope.

There are many names put forward as the inventors of the binaural stethoscope. American writers[21] claim this distinction for Dr. Cammann, but it is clear from what I have already quoted that Comins in 1828 had already had the idea, if he had not actually put it into practice. C. J. B. Williams described a binaural stethoscope, consisting of two metal tubes attached to the bell of an ordinary stethoscope and with flat ear pieces. Dr. Leared showed an improved form at the International Exhibition of 1851, with tubes of gutta-percha attached to the chest piece at one end, and to the ear pieces at the other. I believe this to be the real precursor of the present form. Dr. N. B. Marsh, of Cincinnatti, described a binaural stethoscope in the same year. I cannot trace Dr. Cammann's stethoscope earlier than 1851. It does, however, appear to have been the first stethoscope of the modern form, with metal tubes, spring, rubber tubes, and chest piece.

It is a curious feature of the medical mind that much energy and ingenuity are often expended in devising or in modifying instruments. Both forms of stethoscope amply illustrate this. The rigid stethoscope was made of various shapes, in various sections, and of many different materials. Various woods were tried, deal being a favourite. My own is made of guaiacum wood, which seems appropriate. Ebonite, papier-maché, metal, and even glass have been employed. The ear piece has been made to unscrew or to fold. Forms designed to fit into the hat, needless to say the tall hat, or to fold to suit the pocket have been described. The straight stem[22] has been graduated in centimetres to measure Kronig's area or the position of the cardiac impulse. The ear piece has been grooved and rubber-shod to serve as a plessor or as a knee-jerk hammer. A vacuum stethoscope was described of hollow glass with a vacuum. Piorry described a stethoscope with a hammer to facilitate auscultatory percussion. I have even seen a wooden stethoscope with a second tube attached to the chest piece and a rubber tube going to a single ear piece, making it a hybrid binaural. Perhaps the most bizarre ingenuity was shown in the stethoscope suggested by Sir B. W. Richardson.[23] The ear piece was made to fold, and was of silvered glass to serve as a reflecting mirror; the chest piece had a detachable piece shaped to constitute an ear speculum when required. It is perhaps not surprising that he found it did not come up to his expectations, and that it was liable to break in the pocket. An inverted wine glass has been used as an emergency stethoscope, and I have found a thermos flask quite efficient.

The binaural stethoscope has given even greater scope for ingenious modification. The metal tubes carrying the ear pieces have shown the least variation, but they have been variously carved and jointed. I think the credit of the spring between the two tubes must be given to Cammann, who described the stethoscope as "self adjusting." The form of spring has varied from a rubber band to an actual coiled spring joining the two metal ear tubes. In one form the spring bears the ear pieces and is carved to go behind the head, leaving the field of vision unimpeded. Curiously enough, the only reference our registrar, Mr. Haines Carter, can find to the stethoscope as an instrument in our own Transactions is the description by Dr. G. A. Herschell[24] in 1891 of a lever clamp to fix the two ear tubes when the ear pieces are comfortably at place in the ears, a form which is still in common use.

It is in regard to the chest pieces that the greatest variety occurs. The bell or trumpet form is the commonest, with or without a finger rest attachment. The phonendoscope of Bazzi and Bianchi applied a new principle, and gave a louder quality to the sounds heard. Other forms of diaphragm or disc stethoscope chest piece are the Bowles and the Minchin, both of which are popular at the present time. A revolving chest piece[25] is capable of use as a membrane or phonendoscope type, and then, on turning, as a simple open bell end. A form for the partially deaf has been devised. Teske's stethonoscope is a special form designed to give louder conduction, and is also adaptable as a simple bell end. S. Scott Alison[26] described a "hydrophone," which was a rubber bag the size and shape of a large watch. This was filled with water and interposed between the chest piece and the chest wall. It was said to augment the sounds heard. The same physician introduced the first of the so-called differential stethoscopes. This was a form in which each ear listened through to the sound from a separate chest piece. A more recent form employing two Bowles's chest pieces, has been described by N. Boston.[27] There is fitted in the conducting tube a two- or three-way valve, so that the two areas auscultated can be listened to simultaneously or successively. More complex forms of differential stethoscope were the Bock and the Oertel.[28] It was claimed that by their agency in comparing quantitatively the first sound at the apex with the second sound at the base information as to the efficiency of the myocardium could be obtained.

The most complex forms of stethoscope have been those described by F. D. Parker,[29] one of which he called the refractoscope, the other the partial stethoscope. By their aid he analysed the third heart sound, and he describes a fresh auscultatory sign, the "outflow sound." The first attempt I can trace to produce multiple stethoscopes enabling many people to listen at the same time is that of Landouzy in 1850.[30] An interesting account of the more recent attempts in this direction, including the multiple electrical stethoscope, its uses and limitations, has been given by Dr. Jenner Hoskin.[31] The magnoscope, an electrical stethoscope with a three-stage triode amplifier, has been described and used by Akiro Sato and H. Nukiyama.[32]

Stethoscopy since the time of Laennec.

Laennec's work was so complete that but little modification and extension of his observations with the stethoscope in regard to the lungs have been made. His cousin, Meriadec Laennec, introduced the term vesicular breathing for the normal respiratory sounds. Andral employed the term bronchial respiration, which was previously called tracheal breathing. The significance of pleural friction, which was wrongly interpreted by Laennec, was established by Reynaud in 1829.[33] Laennec used the words tubular and amphoric, but not in respect of the forms of breath sound now so called. Skoda[34] confirmed and extended Laennec's observations, as did also Stokes, Graves, and Corrigan. Skoda gave the present interpretation to the sound called the veiled puff, mentioned by Laennec, but not clearly defined. Baccelli in 1877 first introduced the investigation of the whispered voice.

In regard to the heart sounds, both normal and abnormal, Laennec's work in this respect has had to be corrected and extended. Time will not permit to refer to more than a few of the subsequent discoveries. Laennec heard pericardial friction, but interpreted it wrongly. Its true significance was established in 1824 by V. Collin,[35] who was Laennec's

chef de clinique. Diastolic murmurs were recognised by Bouillaud in 1841. Dr. F. I. Mayor, in 1818, noted the fœtal heart sounds, and used them as a test of pregnancy and to establish the life of the fœtus. J. A. le Jumeau, Vicomte de Kergaradec, rediscovered these in 1822, and first described the uterine souffle.

The stethoscope has also been applied to the sounds produced in the œsophagus, the stomach, and intestines. The sounds heard in joints and in fascial planes must also be recognised. Outside of medicine it is sometimes used in the discovery of leaks in the domestic water-supply.

It is a significant fact that all the more complex forms of stethoscope have had a mere ephemeral vogue. The instrument is admirable for its original purpose—to aid the sense of hearing, especially in convenience and comfort of application, and to assist in the localisation of normal or abnormal sounds. Any attempts to make it subserve other purposes, however ingenious, have been at best partially successful, and have for the most part failed. The real reason for this is that experience in the recognition of the normal and the abnormal is the real necessity in the use of the stethoscope, and this experience must involve doing as Laennec did, determining by combined clinical and pathological study just what the abnormal sounds mean. By this means only can we learn to observe in physical signs and to think in lesions, and no instrumental refinements can lessen or shorten the labour necessary to acquire this experience. There are fashions in stethoscopes as in dress. The tendency of the practitioner has always been to adopt the simplest and most convenient forms, and especially those that give the best conduction and the least distortion of the sounds. I have for years preferred the form with the simple hinged spring, which folds. As far as I can see, the most popular chest pieces at the present time are the ordinary bell or trumpet end, particularly the Starling form, and the flat type with a metal-receiving diaphragm, especially the Bowles and the Minchin. I still prefer the bell form, and preferably one with a wooden or ivory end rather than one of metal, since it is warmer and less uncomfortable for the patient. For a time there was a vogue for covering the chest piece with a small perforated rubber cap, or with a piece of a large drainage-tube. This was supposed to produce better apposition, less discomfort to the patient, and less extraneous sounds from hairs or other factors. The flat forms are undoubtedly useful for examination of the back in patients very ill, and for the auscultatory method of determining blood pressure.

The Present Status of Bedside Methods.

The past of the stethoscope is clearly a great and glorious one. Largely owing to the genius of Laennec it served to introduce a new and fruitful method into medicine, and to inaugurate an era of great clinical advance. The time has come to ask: What of the present? Examiners in medicine and clinical teachers generally agree that the student of to-day shows a less extensive and less accurate knowledge of physical signs, more especially the stethoscopic ones, than his predecessors acquired while at hospital. Let me hasten to add that, in my opinion, this is not the fault of the student, nor is it entirely due to neglect on the part of the teachers. Special hospitals for diseases of the chest and heart, and the increasing control of the health authorities over tuberculous disease, are starving our wards of the cases upon which we can best teach and learn the use of the stethoscope. I have found the student very desirous of learning the nomenclature and the significance of stethoscopic physical signs. Another cause of the relative neglect of physical signs is that we are becoming too specialised and departmental in our medical schools. New methods have arisen to aid us in our diagnosis, notably radiology and laboratory methods, physical, chemical, and microscopical. They are giving us priceless aid, and I believe they are going to give us even greater help, but their findings should be considered only after a full clinical study. They should supplement and not supplant clinical investigation.

I would stress the importance of the taking of careful histories. Laennec, when he went to Paris, spent his first three years in taking careful clinical histories of 400 cases. His cousin, Meriadec Laennec, tells us that it was on this groundwork that all his researches and discoveries were based. Let Laennec tell us his method in his own words:—

> "When a patient enters the hospital it is the duty of the pupil to collect from him those facts which he can give concerning his disease and to follow their course.
>
> "On examining the patient myself, I dictate the principal symptoms which I observe, those especially which may serve to establish the diagnosis or indications for treatment. And I confirm my conclusion unless I may have to change it, by subsequent observation. This dictation, which is made in Latin, for the reasons easily appreciated, is taken down by the pupil in charge of the patient, and at the same time on a separate sheet, which I call the 'diagnostic leaf,' to keep which in order that it may be shown to me, is the especial duty of another pupil. If a new sign appear, such as might modify the first diagnosis, I have that also added.
>
> "If the patient die, the account of the autopsy is collected by the pupil in charge of the case. I read this account before all those who have been present at the autopsy, and if any correction is to be made, make it on the spot."

What I most admire in this description are the calm, open-mindedness, and the clear perspective of Laennec, and it seems to me that these two attitudes of mind must be cultivated by both laboratory workers and clinicians.

The Clinician and the Laboratory Worker.

I have not been bold enough to attempt to forecast the future of the stethoscope. My reading has shown me that the medical prophet is too often a false prophet. He fails alike in prognosis and in prognostication. I do, however, feel that the stethoscope should have our veneration for what it has revealed in the past, and our respect for what it does in the present. The laboratories and the X rays are yielding us valuable help in matters where the stethoscope can only give us indications or inconclusive information.

[The lecturer here pointed out that the tendency to restrict the term "research" to work in laboratories was unfortunate, and continued:—]

What we clinicians ask of the laboratory workers are: (1) Means for assessment of function, and particularly of the minimum organic function consistent with active life. (2) Means for determining the extent and nature of disease processes. (3) A measure of activity in disease processes produced by infective agencies.

What we all need is closer coöperation and a more understanding appreciation of each other's difficulties, as well as a more frank criticism of each other's work. It is because I believe that this ancient but ever youthful society affords the place and the means to achieve these objects that I have ventured to address you on the means of clinical investigation.

My concluding remarks, which if I had followed precedent should have been my first, are to try to express, however inadequately, my appreciation of the honour you have conferred upon me in electing me as your President. It would be difficult for me to put in words the feelings of pride and gratification I experienced when my predecessor in this honoured chair told me of my nomination in that kindly, hearty, and generous manner so characteristic of him.

I have delayed this expression to the end deliberately, because I feel that the genius of this society is in the spirit of the views expressed in this address. The Fellows of this Society represent widely different interests, but we meet here in a friendly spirit to compare notes and to learn from one another. This Society liberally rewards those who work for it and those who attend its meetings, as I have the best of reasons for knowing. The greatest of its gifts is, however, the friendship of its Fellows, to which alone

I owe my position in this chair, and for which I thank you all most heartily.

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31. Hoskin, Jenner.: THE LANCET, 1925, ii., 1164.
32. Sato, Akiro, and Nukiyama, H.: Amer. Jour. Child. Dis., 1925, xxix, 618.
33. Reynaud, Jour. hebd. de méd., 1829, v., 563
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SEX EDUCATION FOR CHILDREN.

A SERIES of leaflets has recently been published by the Association of Infant Welfare and Maternity Centres, in which is given information on the subject of sex suitable for children of varying ages. The first leaflet of the series is addressed to parents, and puts their responsibilities in a clear light; the leaflet for young children is simple and yet adequate for its purpose. Two separate leaflets for boys and girls at the age of puberty gives some explanation of the development through which they are passing and a few rules of hygiene. For older boys and girls a leaflet on the meaning of love puts the subject of sex relationships in a sensible and healthy light. In every leaflet the information is given with delicacy, but without mystery or embarrassment. The series should be a useful guide to parents who have been puzzled by this problem.

VOICE AND THE VOCAL APPARATUS.

A LITTLE brochure [1] by Mr. W. B. Crow, D.Sc., Head of the Department of Biology at the Huddersfield Technical College, provides a pleasant and rambling discourse on the voice of man and animals, with something about the mechanism of its production and something about the theory of its evolution. The author mentions, but does not explain, the vocal registers, and does not attempt to describe the mode of action of the vocal cords in the production of sound; but he discusses, though briefly, a number of interesting things, such as the relationship of voice to sex, and the phylogeny of voice. The vocal habits of various animals are mentioned. Dr. Crow's suggestion that an owl hoots to scare away intruders is unconvincing; with its keen hearing and silent flight, it is probable that the owl uses the sudden sound to frighten its prey into betraying its position. This essay may stimulate the reader to further examination of many interesting questions.

[1] Cambridge: W. Heffer and Sons. 1930. Pp. 29. 1s.

MALTA AS A WINTER HEALTH RESORT.

Dr. E. F. N. Currey writes: "I would like to bring forward the claims of Malta as a winter health resort. The winter season commences on Oct. 1st and continues till the end of April. The climate is mild, dry, and warm, with the maximum of sunshine. Invalids and elderly persons can take open-air exercise, or sit out of doors nearly every day of the year. There is a very fine sea front at Sheiva, the residential quarter, where one can stroll in the sun.

The average daily sunshine: October, 5·9 hours; November, 5·9 hours; December, 5·4 hours; January, 5 hours; February, 6 hours; March, 7·2 hours; April, 8·2 hours. Minimum winter temperature, about 55°. Minimum temperature for the year, 66°.

The climate is suitable for anyone who fears the cold and damp of the winter at home, or elderly persons, or anyone suffering from such diseases as chronic bronchitis, renal, or cardiac trouble. Asthma is frequently greatly benefited. It is not suitable for anyone suffering from pulmonary tuberculosis. There are quite comfortable hotels, at reasonable pension terms. Villas can be rented. There are plenty of amusements and excellent clubs."

THE LATE DR. R. W. MacKENNA.

S. A. K. W. writes: "In your appreciative obituary notice of the late Dr. R. W. MacKenna there is no reference to the lighter side of his literary labours. Surely old Edinburgh men have not forgotten the delight with which they welcomed in the pages of the *Student* the ditties subsequently collected into a rare volume entitled 'Carmina Cadaveris.' One of these depicted the worries of the examinee who, confused and tormented, in his dreams

> '. . . rides the cardiac cycle round,
> The crossed pyramidal tract.'

Couched in a macabre style was the tale of a 'stiff.'

> 'Working man,
> Called Dan.
> Saturday,
> Gets his pay.
> Public-house;
> Big carouse.
> Knocked about;
> Chucked out.
> Fall on head.
> Daniel dead.'

And so on till:—

> 'Fragrant whiff;
> Fresh 'stiff.'
> Students view;
> Subject new.'

With touches such as these did MacKenna add to the gaiety of irresponsible youth."

QUEEN'S HOSPITAL FOR CHILDREN.—This hospital, in Hackney-road, E., has been presented by Sir James Carmichael with an annexe to its Little Folks' Home at Bexhill. The new building, which has cost £4000, contains two open-air wards, giving room for ten beds, and six bedrooms for nurses and servants who have hitherto been badly housed. The capacity of the home has thus been increased to 46, and that of the entire institution to 180 beds.

WORK AT ROEHAMPTON HOSPITAL.—A report upon the 15 years' work of Queen Mary's (Roehampton) Hospital states that of the 41,000 officers and men who lost limbs in the war 24,339 have been treated there for the supply of their first limb, and in many cases their second. Since the institution was reconstructed and extended in 1925 it has been fully occupied, and during the past year further accommodation has been added to provide for the treatment of facial injury, diabetic cases, and other classes of patients transferred from the Queen's Hospital, Sidcup, now closed. Arrangements have been made for the accommodation of a limited number of amputation cases among civilians, primarily railwaymen and miners. The old buildings used for the making of artificial limbs have been replaced by a permanent brick building in order that the work may be carried on more efficiently.